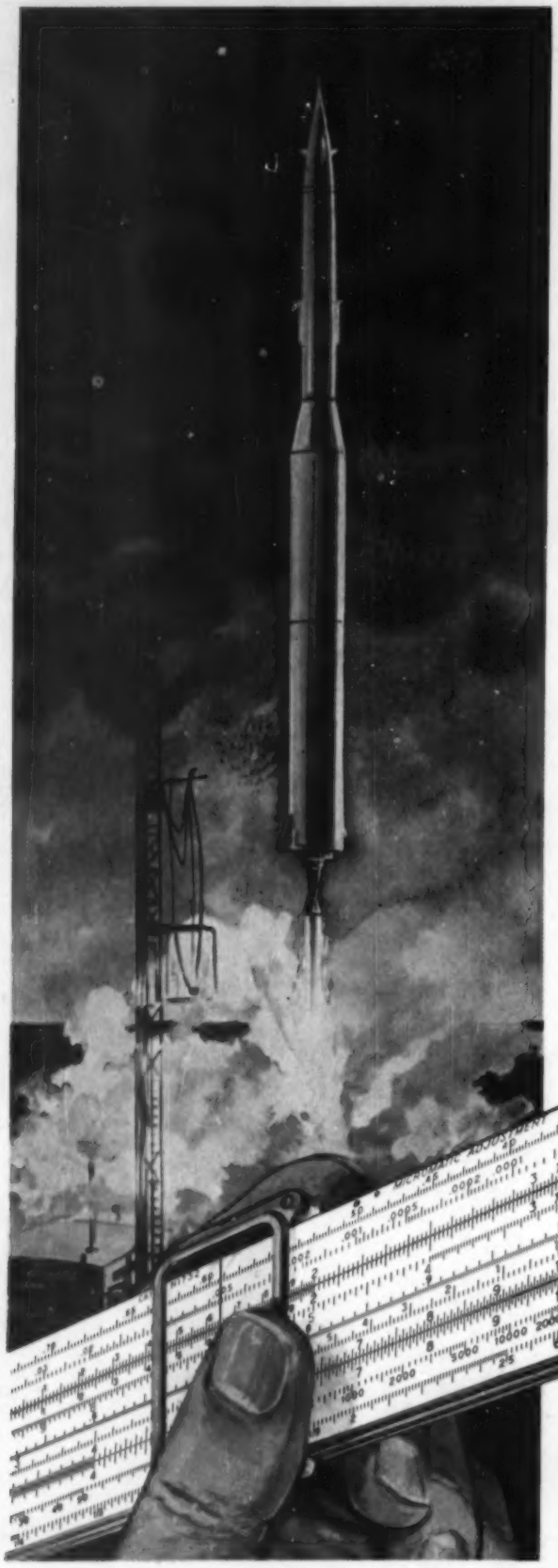
Volume 48, No. 2 February, 1959

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

# INDUSTRIAL ARTS AND VOCATIONAL EDUCATION



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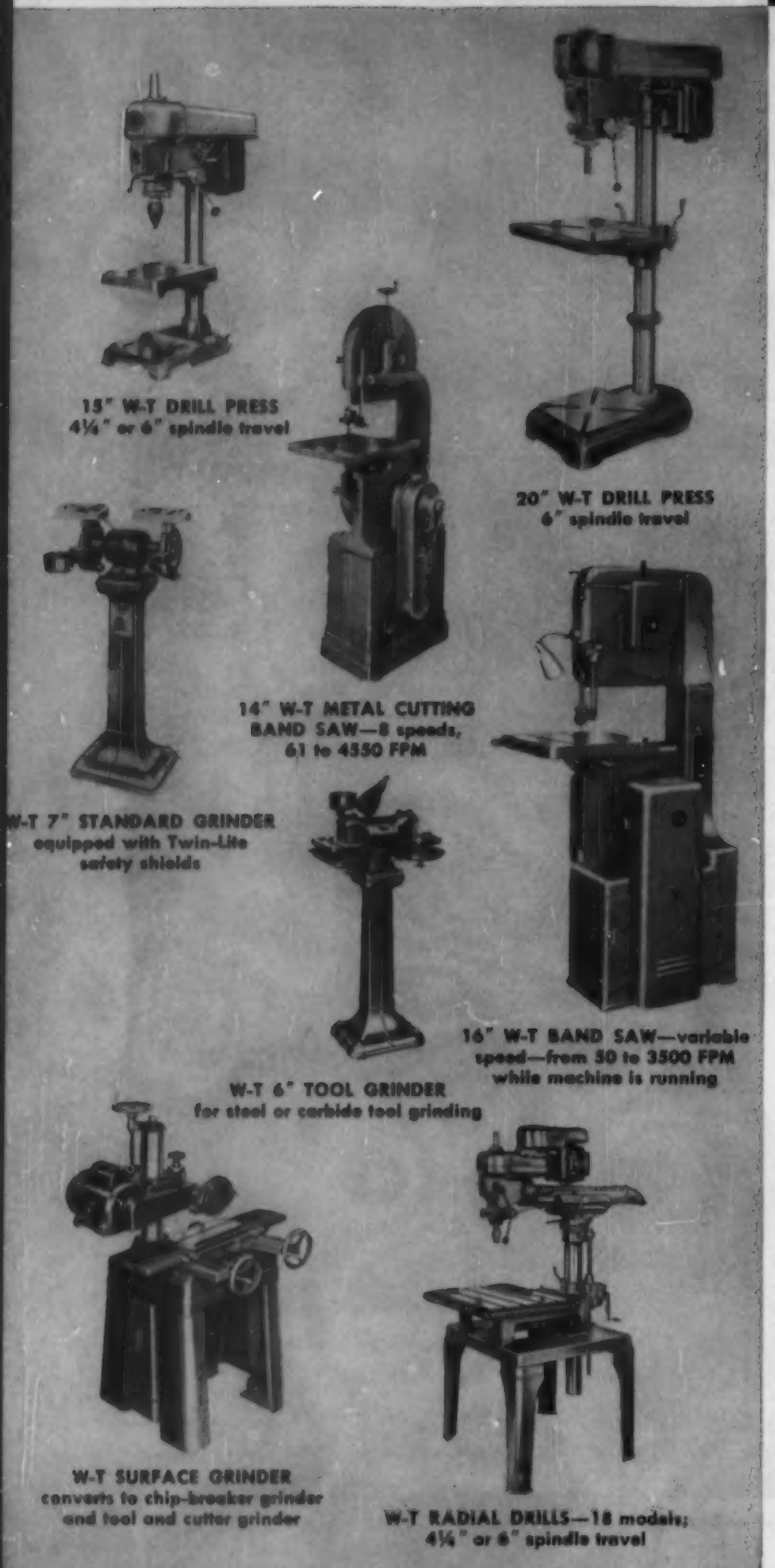
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FEBRUARY
1959

VOL. 48 NO. 2

# Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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## This Month's Cover

Don Bosco Technical School in Paterson, N. J., one of 256 technical schools located on all five continents operated by the Salesian Society, includes modern letterpress equipment in their course of printing instruction.

Michael Borlengo, S.D.B., center, pressroom foreman and superintendent, checking work printed on an Original Heidelberg cylinder press by students John Ryan, Mineola, N. Y. (left), and Peter Sullivan of Reading, Mass.

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# Association News

## COMING CONVENTIONS

*Feb. 27–28. Industrial Teachers Conference,* at the A. & M. College of Texas, College Station, Tex. Secretary, Leslie V. Hawkins, Texas A. & M. College, College Station, Tex.

*Mar. 13–14. California Industrial Education Association,* at Stockton Memorial Auditorium, Stockton, Calif.

*Mar. 19–20. Tennessee Vocational Association,* at Nashville, Tenn. Secretary, W. A. Seeley, 111 E. Cordell Hull Bldg., Nashville 3, Tenn.

*Mar. 19–21. Illinois Vocational Association,* at Pere Marquette Hotel, Peoria, Ill. Secretary, Orlin D. Trapp, Waukegan Township High School, Waukegan, Ill.

*Mar. 27–28. Washington Industrial Arts Association,* at Shadle Park High School, Spokane, Wash. Secretary, Carl Schmidt, N. 120 Locust St., Spokane, Wash.

*Apr. 3–4. Indiana Industrial Education Association,* at Hotel Antlers, Indianapolis, Ind. Secretary, John H. Hinds, High School, Elwood, Ind.

*Apr. 9–11. Michigan Industrial Arts Association,* at Pantlind Hotel, Grand Rapids, Mich. Secretary, John Koenig, 4628 Flajole Road, Midland, Mich.

*Apr. 13–16. Department of Audio-Visual Instruction (NEA),* at Olympic Hotel, Seattle, Wash. Secretary, Mrs. Mickey Bloodworth, Department of A-V Instruction — NEA, 1201 Sixteenth St. N.W., Washington 6, D. C.

*Apr. 16–18. Ohio Industrial Arts Association,* at Neil House Hotel, Columbus, Ohio. Secretary, Robert Boyer, 7463 Midland Rd., Cleveland 31, Ohio.

*Apr. 18–19. Missouri Industrial Education Association,* at University of Missouri Education Building, Columbia, Mo. Secretary, Maurice L. Stewart, State Department of Education, Jefferson City, Mo.

*Apr. 22–25. American Industrial Arts Association,* at Lafayette Hotel, Long Beach, Calif. Secretary, Dr. Kenneth W. Brown, P.O. Box 2626, Buffalo 26, N. Y.

## NOTICE OF CHANGE IN CONFERENCE DATE

The Seventh Annual Institutes for Drafting and Machine Shop Teachers, originally scheduled to be held in Ann Arbor, Mich., on March 28, 1959, will be held *one week earlier, March 21.*

*The University of Michigan, School of Education, Ann Arbor.*

## CALIFORNIA INDUSTRIAL EDUCATION ASSOCIATION

The California Industrial Education Association, San Francisco Bay Section, will hold its Annual Bay Section Workshop on February 7, 1959. The theme of the workshop will be "Greater Learning in Industrial Education Through a Greater Use of Visual Aids and Better Teaching by a Greater Exchange of Ideas, Methods and Visual Aids."

Robert Meier is president of the group, and William Larkin is president elect.

The president of each one of the ten chapters in the Bay Section CIEA will select three outstanding teachers who will give instructions and demonstrations on special ideas, methods, and techniques on visual aids that they use in their teaching and guidance of students. Extensive displays will also be made of visual aids, designs, charts, posters, project ideas, and safety education materials, devices, guards, push sticks, etc.

The program will start at 9 a.m., with registration, coffee, and doughnuts. Demonstrations will start promptly at 9:30 a.m., in ten different classrooms and will be repeated at 10:30 and 11:30 so that each individual can see three different, complete demonstrations and displays.

A luncheon will be served at 12:40.

## N. C. INDUSTRIAL ARTS ASSOCIATION

The North Carolina Industrial Arts Association held its fall meeting at the Goldsboro Junior High School, Goldsboro, N. C., on November 1, 1958. The attendance numbered 125. This was the largest group ever to attend the fall meeting in the 10-year history of the association.

Dr. Kermit Seefeld, president, American Industrial Arts Association, and chairman of the Department of Industrial Arts at Santa Barbara College, University of California, addressed the group at luncheon, on the subject "Industrial Arts in a New Era." Dr. Seefeld also led the morning "buzz session," as North Carolina teachers freely discussed some of the major problems facing industrial arts today.

(Continued on page 6A)


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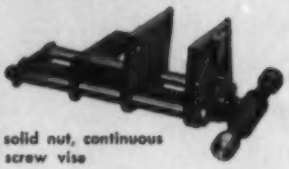
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## ASSOCIATION NEWS

(Continued from page 4A)

Kenneth Mann of High Point, N. C., and president of the N.C.I.A.A., presided over the business session held following the luncheon.

W. K. Whitesel of High Point, N. C., was presented a life membership in the N.C.I.A.A., by the High Point industrial-arts teachers in recognition of 25 years of service as an industrial-arts teacher.

The 8th Annual N.C.I.A.A. Project Fair will be held May 1 and 2, 1959, at Raleigh, N. C.

### NEW ENGLAND INDUSTRIAL ARTS TEACHERS ASSOCIATION

The 21st Annual Convention of the New England Industrial Arts Teachers Association was held at the Hotel Eastland in Portland, Me., on November 14 and 15, 1958. The theme of the convention was "Industrial Arts and the Total Curriculum."

The program on Friday morning, November 14, featured visitations to local industries: Central Maine Power Company, and the Burnham and Morrill Canning Company; and schools: Maine Vocational Technical Institute, and the Gorham State Teachers College.

The Friday afternoon program began with the report of the vice-presidents and state chairmen for each state.

Rhode Island reported a 25 per cent increase in industrial-arts positions and a projected need for a 125 per cent increase by 1961. A recent survey showed that 100 per cent of the superintendents of schools were in favor of the establishment of an undergraduate program in industrial arts at the Rhode Island College of Education.

Connecticut reported that only five of the secondary schools in that state did not offer industrial arts, a decrease of two from the previous year. Also that the Connecticut Industrial Arts Association held its 25th Silver Anniversary convention at the Teachers College of Connecticut in April.

Maine reported a 5 per cent increase in teaching positions, also an Industrial Arts Craftsman Fair held in Augusta sponsored by the Maine Association of Industrial Arts and the Ford Industrial Arts Awards Association.

Massachusetts reported activities of the Massachusetts Industrial Education Society, including the 60th Annual Get-Together Banquet held in January. A Project Fair held at the Auburn High School in May, at which over a thousand projects were entered. and fifty selected to be sent to the Ford National Industrial Arts Fair at Dearborn, Mich. A third event of the M.I.A.W.A. was its participation in the American Industrial Arts Association's 20th Annual National Convention held at the Hotel Statler in Boston. An interesting item brought forth in the report was the fact that in past years the Fitchburg State Teachers College exported teachers to other states to begin and carry on their programs in industrial arts. Massachusetts now finds itself importing teachers from other states to take care of its needs.

New Hampshire and Vermont both reported growth in industrial arts programs. Vermont has now established a Supervisor of Technical and Industrial Education — a position which has been filled by our past-president, Michael Russo.

Discussion groups followed along the theme of the convention. Some of the topics discussed included:

How does the area or type of shop activity meet the challenge of the Sputnik era when there are voices which call for the removal of all "easy" subjects, including shop, from the curriculum?

How does this area or type of shop activity give pupils an understanding of the social and economic problems of our industrial-technical culture?

What method of organization of teaching content in this area or type of shop activity can best contribute to the over-all development of the pupil in the total curriculum?

At the Saturday morning business meeting, an invitation from the Connecticut Industrial Arts Association to hold the 22nd Annual Convention in Connecticut was extended and accepted.

New officers elected for 1959 were: President, Kenneth E. Webber, Maine; Vice-President, G. Wesley Ketcham, Connecticut; Secretary, Edward P. Stach, Connecticut; Treasurer, H. Ward Manghue, Massachusetts.

Second Vice-Presidents and State Chairmen: Connecticut, John F. Fabian III; New Hampshire, Neal D. Gadwan; Vermont, Robert Howe; Rhode Island, Edmund Medeiros; Massachusetts, Joseph A. Chicetti; Maine, Robert Taylor.

Divisional Director of Professional Development, G. Wesley Ketcham.

Divisional Director of Dissemination and Records, George E. Burnham.

Honorary memberships were extended to: Ralph Duso, Cecil Farrar, G. Tappan Little, all of Maine; to Irving Dodge, Clifford Hague, of Massachusetts; also to our guest Dr. G. Harold Silvius.

Drawing of "Ship" prizes under the direction of Charles Lyman of the Brodhead-Garrett Company, and assisted by Bob Campbell of the Stanley Works followed the noon luncheon.

The next meeting of the Executive Board will be held at the Hotel Manger, Boston, on January 24, 1959. — *Edward P. Stach, Secretary.*

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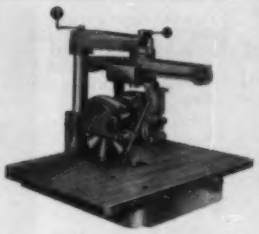

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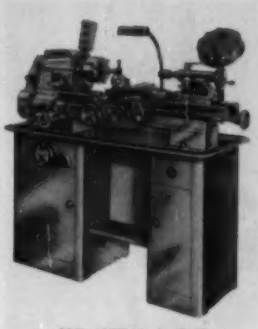

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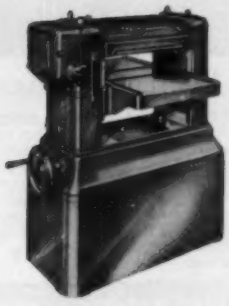

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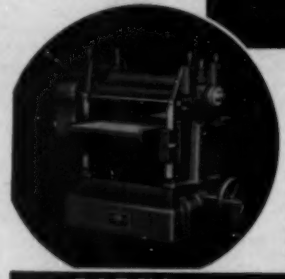

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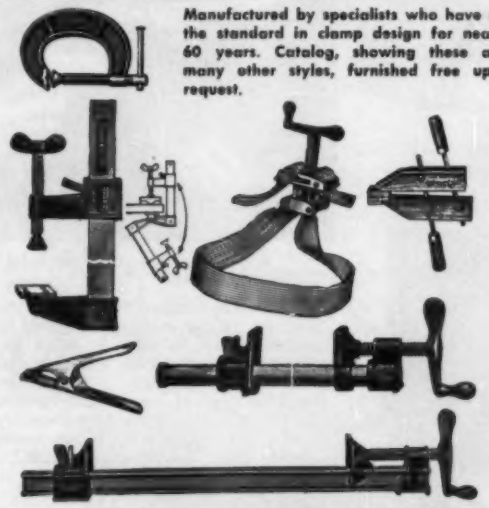

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# Personal News

## GOLDSTEIN AWARDED NATIONAL CITATION

An honor citation was presented to Harry A. Goldstein, Tucson High School photography teacher, at the recent National Press Photographers Assn. convention in Minneapolis.

Goldstein, who also is secretary-treasurer of the Arizona Press Photographers Assn., is the first high school teacher to be so honored by the national photographers organization.

The citation recognizes his contribution to student photo-journalism and professional photography groups.

## LLOYD P. NELSON SUCCEEDS DR. SCHMIDT

Lloyd P. Nelson, associate professor, has been appointed head of the industrial-arts department at Ball State Teachers College, Muncie, Ind., according to an announcement made recently by Dr. John R. Emens, president of the college. Dr. Nelson succeeds Dr. Fred Schmidt who died in the early fall.

Dr. Nelson came to Ball State in 1953. He had been an instructor in the Institute of Aviation at the University of Illinois from 1949 to 1953 and had taught industrial arts at the Rantoul, Ill., High School. He received his bachelor's, master's, and doctor's degrees from the University of Illinois.

He served as civilian instructor in navy training schools and had a tour of duty in the Pacific during World War II. He has had valuable trade experience.

Dr. Nelson is a member of Phi Delta Kappa education service organization, the American Vocational Association, the Indiana Vocational and Practical Arts Association, the Indiana Industrial Education Association, the American Industrial Arts Association, and Epsilon Pi Tau, an honorary in his field.

## DR. FRANKSON AT SOUTHEAST ASIA

Dr. Carl E. Frankson, chairman of the industrial-arts department at Montclair State College, Upper Montclair, N. J., has been selected by the U. S. State Department to serve as a technical advisor to the Bangkok Technical Institute in Thailand. He left on November 28 for the 21-month assignment in Southeast Asia.

Going abroad as a representative of the U. S. International Cooperative Administration, Dr. Frankson will have as his main task the planning of a curriculum for prospective teachers of vocational education and industrial arts. He has been granted a leave of absence by the State Board of Education until September 1, 1960.

Dr. Frankson is a native of Minnesota. He came to Montclair State College in 1955, following eight years as chairman of the industrial arts department at Newark State College. He earned his B.A. at Mankato, Minn., State Teachers College, his M.A. at Colorado A. & M. College in Ft. Collins, and his Ph.D. at Ohio State University in Columbus. During World War II he served with the U. S. Navy.

## ALI KEMAL KERPICCI

First foreign student ever to earn a master's degree at Stout State College, Menomonie, Wis., is Ali Kemal Kerpicci (rear). He is the director of the Men's Technical Training College, Ankara, Turkey, and beams as he presents his completed thesis to Dr. Ray A. Wigen, director of Stout's graduate studies program.

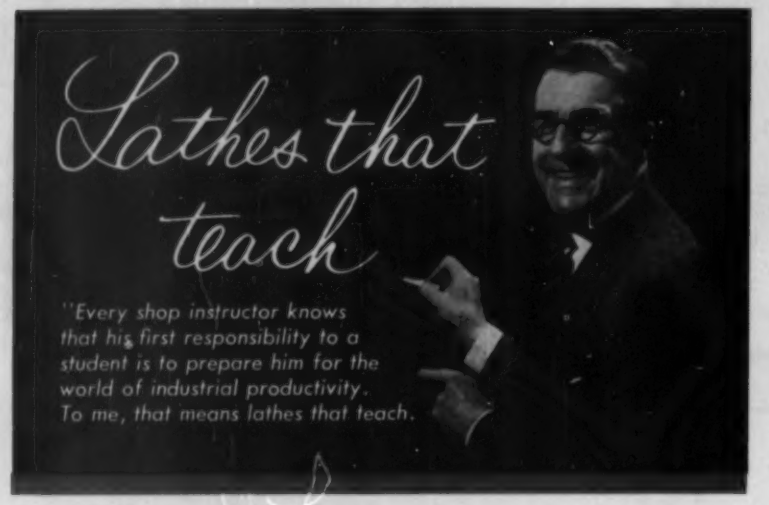
Ali Kemal Kerpicci (at left)

Mr. Kerpicci hopes to send, in sequence, 10 of his faculty members to Stout to earn master's degrees in such American industrial education procedures as administration and audio-visual techniques. Although he completed his thesis at a good pace, he spent four months, in the constant companionship of a dictionary, translating his native tongue into what he calls "your illogical English."

## RAYMOND S. GINN, JR.

Raymond S. Ginn, Jr., an instructor of industrial arts at Lanier Junior High School

(Continued on page 12A)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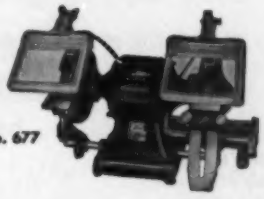


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## PERSONAL NEWS

(Continued from page 10A)

for Boys in Macon, Ga., since 1949, has joined the State Department of Education staff as industrial-arts consultant in the Trade and Industrial Service of the Vocational Education Division.

He is a native of Ludowici, Ga., and attended public school there and was graduated from high school in 1943. He received his B.S. degree in education from Georgia Teachers College in 1949, with a major in industrial arts education with a minor in mathematics. He received his master's degree in industrial arts and vocational education from the University of Florida in 1952.

Mr. Ginn has served as Sixth District chairman and president of the Georgia Industrial Arts Association, and was treasurer and on several committees of the Bibb County Education Association. He is a member of Epsilon Pi Tau.

### JOSEPH RISSE NAMED TO POST

Joseph A. Risse has been named director of the School of Electrical Communications, International Correspondence Schools, Scranton, Pa., according to Lawrence W. Tice, ITC-ICS President.

A native of Honesdale, Pa., Mr. Risse is a graduate of Honesdale Catholic High School, and also Walter Hervey Junior College, New York City, where he received his Certificate in Radio Electronics Engineering. He is presently studying at the University of Scranton.

During World War II, Mr. Risse served as an Electronics Technician with the Army Signal Corps. He was separated from service in 1946 after two and a half years of duty in the China-Burma-India theater of operations.

Prior to joining ICS, Mr. Risse was associated with Western Union as a night manager of the Jersey City, N. J., office; Radio and TV Station WNBF, Binghamton, N. Y., as a Staff Manager, Transmitter Operator, Maintenance Engineer, and Studio Engineer Supervisor, respectively; and Radio and TV Station WHUM in Reading, Pa., as Chief Engineer. He has also been associated with TV Station WDAU in Scranton.

A member of the Institute of Radio Engineers, Mr. Risse joined ICS in 1956 and was named assistant director of the Electrical Communications School in September, 1957.

### DR. SILVIUS ADDRESSES CONVENTION

G. Harold Silvius of Wayne State University, Detroit, Mich., addressed the 21st Annual Convention of the New England Industrial Arts Teachers Association on November 14, 1958, at Portland, Me. His subject was "Industrial Arts and the Total Curriculum."

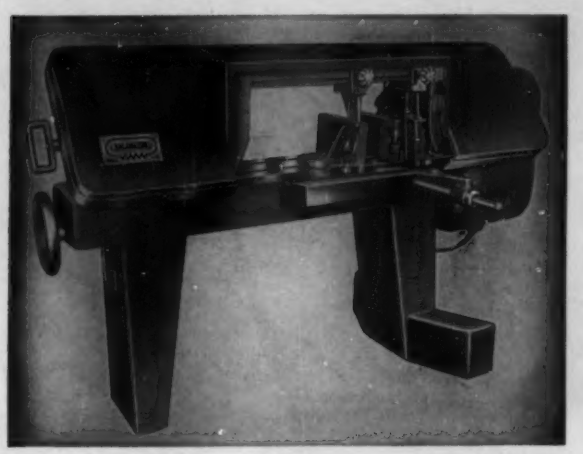
He also addressed students and alumni on "Some Observations Regarding Industrial Arts" at the Gorham State Teachers College, Gorham, Me., on this same date.

### D. P. HATCH IN NEW POSITION

David P. Hatch is now associate professor of arts at Antioch College, Yellow Springs, Ohio.

He was formerly assistant professor of applied art at the University of Oregon, Eugene, Ore. He has a B.A. in education, and a M.A. in applied arts. He was lecturer one year at the newly established State Training College for Teachers, Mandalay, Burma, where he taught industrial arts including general shop as well as mechanical drawing and drafting.

(Continued on page 20A)



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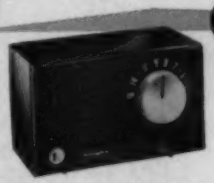

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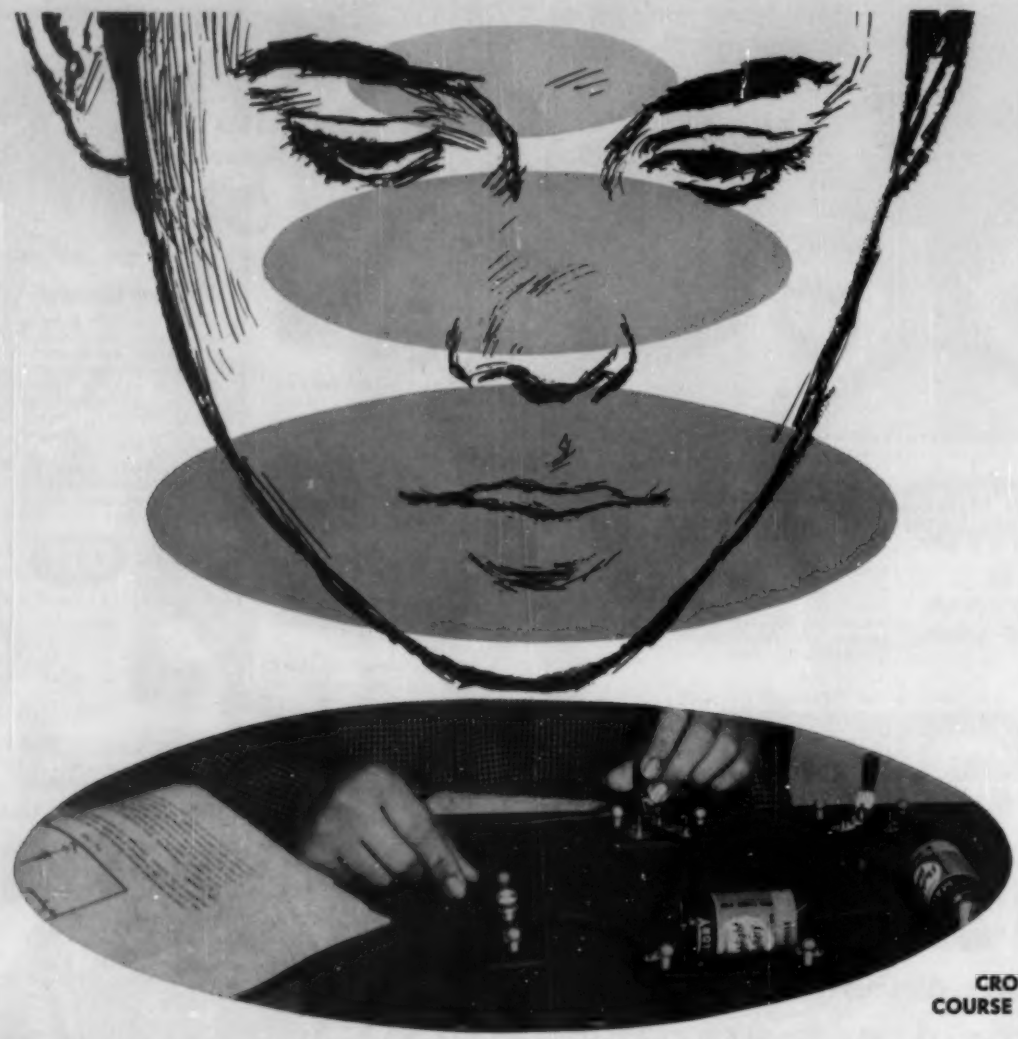

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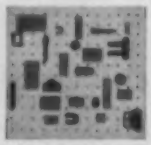

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
FEBRUARY 1959

# Our Automated Industrial Revolution—Part II

**THOMAS A. HIPPAKA**
Iowa State College
Ames, Iowa

### Automation

It could very well be said that the careless use of the term *automation* by too many people has literally made the word a misnomer. It was not until the year 1956 that it first made its appearance in our dictionaries.

### What Is Automation?

Is it any wonder that D. S. Harder, vice-president, Manufacturing, Ford Motor Company, was prompted to write:

> Automation has become a "catch-phrase." . . . The "hucksters" appear to like the sound of the word.

Neither the absurd optimist nor the purveyor of doom are right. Automation with all of its miracles will go for naught without human integrity, intelligence, initiative, imagination, purposefulness, creativeness, superb craftsmanship, and the Golden Rule thrown in for good measure.

John Diebold made this all-inclusive statement regarding automation:

> Automation is a means of analyzing, organizing and controlling our production processes to maintain continuous optimum use of all our production resources — human as well as material.

Thus we see that the process involves the complete integration of the powers of the complex machines devised by man, and the imagination and creativeness with which he produced them in the first place.

In spite of the numerous and very excellent presentations of the subject in our newspapers and periodicals, the real meaning of the word is escaping too many readers. There are those who would tell us that automation was fully realized when we established the first production line in industry. Still others contend that automation caused the so-called Second Industrial Revolution, which in itself is difficult of absolute identification. The shortsighted pessimist can only see widespread unemployment, with an increasing number of mental hospitals filled to overflowing with patients. The absurd optimist would have us believe that the newly developed process will create a dream world where people will dwell in luxury, ease, comfort and unheard-of leisure. He is attempting to tell us that human effort will no longer be essential in a pushbutton system of production.

On the contrary, Frank G. Woollard brings us to our senses with this pointed statement:

> . . . if by the term "automatic factory" one is tempted to think of a plant in which the materials are loaded at the beginning of the week, when everyone goes home to play golf expecting to come in on Saturday morning to find the work loading itself on trucks for dispatch, the automatic factory is just a pipe-dream.

Originally the word *automation* was designed by a Ford Motor Company team to identify the work performed by transfer machinery. Thus, Del S. Harder and John Diebold became the chief claimants to the term which was intended as a nickname for transfer machining, a process that had already been in use for a considerable period of time.

In fact, their first definition of the word included only a part of the total process as they described it in these words:

> Automation is the automatic handling of parts between progressive production processes.

In all of its elements, automation is not new. Its components have been evolving in various forms for a very considerable period of time. What is really new in automation is its extension to separate units such as the discrete units involved in the total manufacture of automobiles.

The contention could very well be made that the First Industrial Revolution which began very early in the nineteenth century made a unique contribution to automation. Production was finally accelerated to a point where only the speed of human reactions sets the limitations on the rate of mechanical production. This condition constituted a very happy circumstance for the worker.

The Second Industrial Revolution really accelerated the evolvement of the components which, when brought together, terminated in what is now known as *automation*. The revolution itself has been characterized by a time scale measured in less than thousandths of a

second, which is clearly out of the realm of the speed and power of human reactions.

Automation has been given numerous other connotations which smack of oversimplification, as far as definition is concerned. There was a time when R. H. Macmillan defined automation merely as "automatic production." Frank Woollard called it "a system and method of making processes automatic." He emphasized the word "system" because he believed that automation was really a management process. Automation, as we know it today, represents a completely new theory of production.

Automation became feasible when industry succeeded in coupling the output of one machine to the input of another in such a manner that the process resulted in financial profit. Thus the component which became known as "positive feedback" became a reality in the field of industrial mechanization, an important adjunct to automation.

### Feedback

John Diebold has cited a readily understandable example of feedback:

> Consider, for example, an "automatic" street-lighting system. Typically, such a system turns on the electric lights at a certain hour and shuts them off again at another fixed time. Though the system starts and stops automatically, it cannot be said to be self-regulating. To make it self-regulating we would have to introduce feedback — in the form of a device which would operate the lights according to actual light conditions. Such a device would consist of a light-sensitive instrument, such as the light meter used in photography, which could be set to activate the lighting system whenever the natural light fell below a certain point, regardless of the time of day.

Later, the term "cybernetics" was coined to denote the study of feedback mechanisms. Feedback has to do with fluctuating phenomena often found in nature and in the fields of science, of which the clock and the heart constitute readily understandable examples. The hypothesis quite commonly expounded maintains that a closed loop system prevails where regular fluctuations occur. According to the Rt. Hon., The Earl of Halsbury, "Feedback is attained when the output of a system feeds back into the input so that the whole system becomes self-actuating." The hearing aid is a good example of feedback as he defined it. Negative feedback is present whenever the output is being subtracted from the input, and not added to it. The self-styled inventor of the "perpetual motion machine" might have gotten some encouragement from the concept of "feedback" if he had been aware of its existence.

Fortunately for humanity, industrial progress has been evolutionary as well as revolutionary. Industrial revolutions have not only created new technological components, but they have articulated the new with the old. Most emphatically, both proved to be true in the Second Industrial Revolution, which culminated in a method of industrial production, known as "automation." The components of this method have gotten to be known as transfer machining, automatic assembly, communication engineering, and control engineering. When understood as a situation where these four components play their full part, the meaning of automation becomes clear.

In the first two, human muscles are constantly being replaced by machines, while in the last two, human nerves and brains are replaced by machines.

### Automatic Machines

As we have already noted, transfer machining is not new. Special machines with automatic work transfer and self-acting clamping mechanisms were built by Morris Motors of England as early as 1923. Today, transfer machining is commonplace, indeed. It connotes the automatic movement of complete work from one machine tool to the next in the proper sequence of operations.

Automatic assembly has been practiced for a very considerable number of years. The internal combustion engine for automobiles has been assembled automatically for a comparatively long time. More complex subassemblies will be made automatically as circuit components are redesigned. Automatic assembly is gradually eliminating human effort in this phase of the manufacturing process.

The Rt. Hon., The Earl of Halsbury has this to say about further elimination of human intervention in mechanized assembly:

> There is one technological novelty in this field of automatic or mechanized assembly which may bring about some major changes. I refer to printed circuitry, associated with dip soldering techniques and hopper-fed components, which permits of the assembly of some classes of electric hardware without human intervention.

Communication engineering is an extremely complicated area of endeavor in the total process of automation. Without this all-important component, automation as we know it could not exist, and what is more, make the rapid strides that it is continuing to make. In the first place, the divorce of signals from power, needs to be understood. Generally, the original pattern of signals is termed as *input*, which is then processed and converted into a different pattern of signals called an *output*. In the final analysis, it may be said that the automatic control of today's complicated systems depends upon reactions to signals properly processed and co-ordinated. Signals are processed with an intricate piece of equipment called an electronic computer. Not only does this complicated machine process the signals, but it couples the input with the output. Computers and machines are now being synchronized to the point where the output of the machine depends upon the instructions fed to it through the computer.

Automatic control is not entirely new; its development is of long standing. The first automatic control was used in water mills, later adapted to the centrifugal governor of a steam engine developed by James Watts. The nineteenth century produced a loom controlled by punched cards. The player piano had its roll of paper with punched holes. The thermostatically controlled heating plant has been with us a long time. Automatic pilots are not new. The motion of cutting tools is now controlled automatically. Multiple loop control systems now govern more than one element in a situation. Cascade control, where one controller changes the set point of another controller, is becoming more common. Control systems govern such essentials as temperature, pressure, and even dangerous elements which go into the making of chemical products, all of which can jeopardize the lives of workers, if the system fails to function as it should.

In the words of John Diebold:

> Actually we are now leaving the push-button era and entering an era in which buttons push themselves.

The principles of automation are not confined to nonflowing, unyielding solids; they apply to the area of liquids, fluids, and semifluid products, as well.

The Rt. Hon., The Earl of Halsbury's all-inclusive portrayal of automation sums up the whole of this miraculous, man-made phenomena in these words:

> The use of the word has spread to cover what is neither a technique nor an invention, but a situation in which four independent components play their part. Each of these components is important in its own right, but in the field of automation each becomes on occasion more powerful in the presence of others. They are transfer machining, automatic assembly, communication engineering and control engineering.

### Materials Handling

American industry went through a

developmental stage where the machine operator was indispensable. He picked up the material to be machined from a stock pile, fed each piece into the machine, and fastened it securely in place before he threw the switch on the machine. When the machine had completed its work, the operator removed the work and placed it on another pile. He examined each piece before and after machining for any flaws or inaccuracies in workmanship. It was the operator's responsibility to check the machine continuously for any operational inefficiencies which might occur. He kept a record of the number of pieces which he had machined and was paid accordingly.

The handling of materials has always been a problem. This category in the total process of automation has included loading, transfering, fixing, assembling, packaging, unloading, and storing. For many years, parts being manufactured were transported to the various sections of the factory depending upon the operations to be performed. When line production was realized, machines for each operation were brought to the line. Naturally the continuity of such an operation minimized and simplified the handling of materials. In the area of materials handling, automatic assembling often proves to be the most difficult problem. There are times when the product must be redesigned before its automatic assembly becomes feasible, thereby risking its acceptability by the prospective buyer.

### Mechanisms for Moving and Locating Work

Vickers Incorporated of Detroit built the first hydraulic mechanism for locating, cramping, and moving work. It is said to have been so efficient that one man was able to do the work formerly done by six men.

When the Ford Motor Company installed its first automatic moving machines, the potentialities of automatic transfer became a reality.

Automation engineers now design plants in such a way that materials once fed into the machine never touch the floor again, or come to a stop as they progress toward becoming a marketable product. The completed product may then go to an assembly line, a warehouse to await delivery, or it may be wrapped or packaged automatically, and loaded upon conveyances ready for delivery.

Interoperational transfer is an important phase of material and product movement. Shuttles make interoperational transfer possible, overhead, lengthwise, as well as broadside. Turntables and roll-overs sometimes combine, in order that the turntable can shunt the workpiece to another machine line, running at right angles to the original line, simultaneously inverting the workpiece. Such interoperational mechanisms are electrically controlled, so interlocked that the transfer takes place, as planned.

Inspection, as practiced today, is one of the miracles of the automatized system of production. Products in various stages of completion are inspected without any interruption to the continuous flow of the work. Automation, as we know it today, would be an impossibility without this essential development. Continuum in processing is an absolute imperative. Tapped holes can be probed by blowing out the chips with compressed air injected through a hollow prober. Automatic apparatus will stop the machine and signal attention to the particular section from which the obstacle cannot be removed by the prober. In order to gauge an opening to its proper measurement, the gauge is made to enter the hole, and the size of the opening is determined by the amount of air that passes between the gauge and the sides of the opening. A manometer scale provides an accurate reading of existing disparity. Workpieces too inaccurate for any use may be splashed with yellow paint and be picked up by a photoelectric cell which puts into motion a mechanism that switches the part to a scrap or a rework line.

Inspection must parallel production at all times. The first essential is that inspection must proceed with the speed of production. Since operation is continuous in automated production, inspection must become continuous as well. It will take place while the machines are in full operation so that the rate of production is curtailed in no way, whatsoever.

The advantages of a manufacturing process of which automatic transfer of materials is an important part are many and varied, indeed. There is no denying the obvious economy in floor space area, as well as in matters of economy of stock and work-in-progress. Economy of labor results directly from the automatic control of processes, as well as the maximum utilization of the plant. Automatic inspection is bound to result in the minimum of spoiled work. In many areas of manufacture, machine handling has overcome most substantially the damage encountered when products were largely man-handled.

### Automation and Safety

Automation is constantly improving the industrial safety record. Automation is not only reducing costs, but it is supplying more goods and services to a greater and more varied group of customers. Automatic production will always tend to offset the scarcity of labor if and when that happens to be a problem. An ever shortening work week, more holidays, longer vacations, sick leaves, earlier pensions and retirements, as well as more years spent in school by youth, all help to complicate the labor market for which automation constitutes a ready antidote.

Tool changing will always be a problem where expensive, automatic devices are employed in production. The waste of machine time cannot be tolerated where great amounts of capital have been invested in equipment. The replacement of tools is reduced to a minimum by setting speeds and feeds so as to afford the cutting tool the longest life possible.

Planned schedules of change must be adhered to at all times. Tools are changed and sharpened whether they need it or not between shifts, or at mealtimes. Tool cribs are now fitted with "tool-o-meters" which warn the supervisor that the tool is nearing the time when it must be replaced. The "tool-o-meter" affords considerable tolerance, so that several tools "are in the red" before the tool setter needs to stop the machine for tool changing. Thus, "down time" is kept to an absolute minimum to facilitate the movement of materials.

*Transfermatic* machines grouped in lines carry storage space between them. Sufficient workpieces which have just left the previous section are kept in suspension on transfer shuttles, in case a section has to be shut off for a tool change. Section two can then borrow from section one, in case the latter has been closed down. Section two will have enough workpieces to keep it running until the tool change has been completed on section one. If necessary, section one can feed pieces into the storage compartment while section two is having its tools changed. Such a process can take place throughout the entire line. The best possible machine utilization is secured because machines can then be run during consecutive shifts.

Power presses constitute an important concomitant of the automatic industrial process. After the sheet has been placed in the press, the top die closes and forms the pressing. As the top die rises, ejectors in the bottom die push the workpiece up from the die approximately one inch. It is then gripped by the *iron hand*, which with the aid of a pneumatic cylinder, lifts the piece vertically to clear the die. As the pressing is carried away by an arm propelled by another pneumatic cylinder, the fingers in the arm can be made to drop the piece at will between the limits of the arm's swing. Accidents to operators of power presses are virtually unknown.

Another type of press has its dies so inclined that the pieces slide out of the

die onto a conveyor. Presses are arranged in a circle, with only one attendant supervising a consecutive process of operations resulting in the completed product.

Without transfer machinery, automation as a process would be well nigh impossible of accomplishment. Tasks too arduous, unhealthy, and even dangerous for human beings to perform are constantly on the increase. For example, the manhandling of fissionable materials in a nuclear plant would endanger too many lives; automatic means constitute the only safe answer. Management will be compelled to resort to automation when the working conditions become too hazardous for manhandling of materials, even though the initial outlay for the automated facilities adopted is costly.

### Computers

Computers may be designated under two classifications, the digital computer, and the analogue computer. Naturally, the digital computer works solely with digits, while the analogue computer simulates the problem assigned to it.

Thornton C. Fry of the Bell Telephone Laboratories summed up the role of the high speed digital computer in these words:

> We will find the machine a willing slave capable of Herculean labors. But for all its prodigious powers, the slave requires an intelligent master.

As production machines process raw materials, thereby producing a useful product, so computers process data appropriately coded prior to the computer's operations. It naturally follows that the efforts of all production machinery, as well as those of the computers, are carefully articulated in any well-managed factory.

The early history of the development of the computer constitutes a fascinating story. The first digital type of computer was the abacus, an instrument employed in performing calculations by sliding counters along rods or grooves. Pascal toyed with the idea of an automatic computer as early as the year 1642. In the year 1829, Charles Babbage drew the plans for the first automatic computer, which he actually began to build, but which he never completed.

The first computer of any note, as far as its utility was concerned, was made at Harvard University in the year 1944. The Harvard Computer was operated by relays and mechanical, as well as magnetic clutches. It performed five additions, or one multiplication of ten digits in one second.

Naturally, the first Harvard Computer was a far cry from the more recent ones. Transistors and germanium diodes have replaced tubes, thereby reducing power requirements. Modern computers perform thousands of additions and multiplications within a single second. The more modern computers count by twos rather than by tens, thereby permitting the machines to be made smaller, as well as adding to their efficiency. Present-day computers are not only valuable for their accuracy, but they are highly useful for their speed. Data can be quickly processed, thereby expediting the immediate solution of a problem.

John von Neumann, a Hungarian born physicist, did more to develop the electronic computer than any other single individual. In building the MANIAC, Mathematical Analyzer-Numerical Integrator and Computer, he created the prototype for the calculating machines which followed his *brain*. No doubt, von Neumann employed his miraculous creation in developing the implosion method which very materially speeded up the development of the first atomic bomb.

The electronic computer is an indispensable part of automation. It constitutes the acme of rivalry between man and the machine. This "thinking machine" actually challenges man's intelligence in some respects.

John H. Troll, an eminent physicist, analyzed the marvels of modern machines, more especially the electronic computer, in these sanguine words:

> . . . the newest machines possess human traits that had always been considered far beyond mechanization. Here we find not only electric eyes that see, and sensing devices that feel, but also memories that recall and logic sections that classify, arrange, and select. These machines can make choices, comparisons, and decisions, learn from past experience, and reach logical conclusions on the basis of premises.

Man's "thinking machines" perform near miracles. UNIVAC, for example, has predicted with astounding accuracy the outcome of an election on the basis of very early returns. Within one hour, the SEEAC performs the multitude of calculations required to design a photographic lens which took the experienced lens designer six years to do with pencil and paper. The ENIAC is one of the largest electronic computers made by man and has 10,000 tubes or *brain cells*.

Miraculous as these electronic computers are, there are certain operations which only the human mind can perform. Man must still create the ideas and connect such ideas in a functional relationship. The human brain as a filing system is so adaptable that it can be reshuffled from an enormous number of viewpoints; its cross indexing possibilities are tremendous. The electronic computer cannot create new cross indexes. Man must continue to designate the approaches, furnish the bases for the machine's operation, and to make the consequent generalizations.

Naturally the parallel between any automated factory and the automatic computer must be close. Each must have facilities for loading, storage, transfer, control, and unloading. The two primary functions of the computer will be to perform clerical duties and to control machines.

In the chemical industries the actions of automatic controllers are matched with the plant and its processes in order to afford the best possible control with the given equipment. In an oil refinery, *end product control* is secured by analyzing the final product and adjusting the controllers accordingly. When this is done automatically, the right corrective impulses are fed to the various controllers, since the computer is capable of detecting and rectifying its own faults. Master controllers will eventually control the machines and processes in most production lines. Thus, the electronic computer has literally revolutionized the first phase of management in automated industry.

Automatic computers not only save time, but they play a vital role in the control of an automatized factory. One of their several functions is to process information. The TRIDAC is one of the largest analogue machines made. In the ENIAC, the Electronic Numerical Integrator and Calculator, electronic circuits have replaced electromagnetic relays as the name of the computer indicates. The EDSAC, Electronic Delay-Storage Automatic Computer, adds six times as rapidly as the ENIAC which performs 5000 additions or forty multiplications of two ten-figure numbers per second. The Whirlwind does 200,000 additions or 25,000 multiplications in a second. The MANIAC adds all numbers simultaneously, while the EDSAC takes figures one at a time.

To effect the control of the Missouri River, involving four reservoirs in Montana and the Dakotas, a briefcase full of statistical materials composed of thousands of figures of five and six digits were readied within two days and fed into a UNIVAC computing machine. Within an hour, this electronic brain produced a set of answers which would have necessitated five months of mathematical computation, done in the traditional manner. What is more, as new problems arise regarding the Missouri River, the UNIVAC will continue to provide the answers. Thus, schedules of water usage, as well as the amount of power to be generated in the hydroelectric plant, are readily calculated by

this electric brain. Through the media of teletype and radiophone, men direct the release of dammed-up water, stored miles away from the central station.

Before any high speed computer can begin its work, the problem must be programmed. Codification of the data is an essential part of this process. Programming constitutes 90 per cent of the effort involved in the total process of computation, and it must be done by the human mind. To program a problem means that a human being must set the problem up for the computer in the first place, and to formulate detailed and specific steps for the computer to perform during its operation. The machine cannot produce any information which is not included in the data. Although the machine can extract information from the data given it, it cannot think. It can only receive data, work upon it, and transcribe such information into a more useful form. Thus, the computer helps the research worker, who possesses real creative ability to gain greater freedom in his work.

The storage, or memory unit is one of the many unique features of a modern electronic computer. Three types of units are being used, and they may be divided into three general categories, according to their type: the static storage unit, the mercury delay tank, and the recording unit.

There are two types of the static storage units which constitute the newest of the memory circuits. The first, the magnetic core unit, consists of circular shaped pieces of ferrite material, quite similar to recording tape, cut into small pieces, connected together at the ends. When a large number of the ferrite strips are used together, the combination of those which are magnetized, and those which are not, serves as the information which is being "remembered." In the second type, which is the cathode ray tube memory unit, the information to be "remembered" is displayed on the screen of the tube, much as it is in an oscilloscope, or in a television set. Instead of disappearing immediately, however, it is made to remain there. As the information is needed, the machine *looks* at the screen to find out what is there.

The earlier computers were equipped with the mercury delay tank which serves as a *remembering* device. *Memory* becomes possible because it takes a sound wave longer to travel through mercury than it requires an electrical impulse to pass through a wire. When information is to be *remembered*, it is applied to a storage unit as an electrical impulse, where a crystal changes it into a sound wave; after which it passes through the mercury. As it reaches the other end of the mercury container, the sound wave is changed back into an electrical impulse by a second crystal and amplified, after which it is fed back into the mercury tank to repeat the cycle. When the information is needed in the memory unit, another circuit is connected; and the information is read and transferred to the usable location.

The operation of a recording unit type of memory is similar to that of a tape recorder. All information to be "remembered" is applied to a recording head, where it is recorded on magnetic material. Actually, there are two types of this unit. The first uses magnetic tape for recording material. It increases the flexibility of the computer, which has another kind of memory unit built into it. The other type of unit is made up of a drum. This is coated with magnetic material which is spun past the recording heads.

### Electronics

While the word *electronics* is generally associated with automation, all of the total process known as automation does not involve electronics.

E. M. Hugh-Jones indicates that "five associated achievements can be discovered" by electronic devices:

"First, there is accomplished a divorce of function from extension." In transmitting force, "an electronic assembly can therefore be squashed together, or laid out in a more spacious fashion to allow for easy access, without the complications which would arise in its mechanical counterpart." Mechanical transmitters of power consume space, often more than is really available. Utilizing electronic appliances minimizes this problem.

"The second great achievement is that of fabricational simplicity." The placement of the parts of a mechanical transmitter take great spatial accuracy. Such is not the case with an electronic assembly. Copper wire does not need to be placed with the same degree of accuracy as mechanical parts. Electronic equipment can be manufactured at less cost than many mechanical transmitters.

"Third, signal generators can be constructed that will convert mechanical signals into electrical ones." These devices are known as transducers and were first found on telephones and record players.

"The fourth accomplishment of electronics is the amplifier." An electric amplifier does the work of a capstan, but is free of its physical complications.

"The fifth accomplishment is the relay or servo and represents an extension of the idea of the amplifier." It triggers a bigger trigger until the desired power is achieved.

*Electronic brains* will control more and more of our machines and other mechanical equipment. Electronically controlled trains and planes are a reality, and in due time, electronics controls can very well become so common place that they too will be taken for granted.

It is impossible to consider the area of electronics without thinking in terms of computers. Electronic computers are more intricate than continuous analytical equipment can ever become. Electronic computers are taking the place of interlocking circuits where transfer devices move pieces from one machine to the next. Computers have a particularly delicate task to perform, since all machines in the line must have completed their operations before transfer takes place.

Electronic computers assist with clerical duties, as well as stock taking, and they produce facts and figures upon which managerial decisions are based.

Electronic computers perform the intricate task of controlling the motion of cutting tools themselves.

It is not too fantastic to vision an electronic computer which will have built into it the necessary information as to how to act when certain changes take place in the product's composition. Naturally, the problem is to decide what instructions to build into the master controller. In principle, the electronic computer can very well replace the operator or supervisor, as he is called.

Due to their complex functions, interoperational mechanisms are extremely complicated. It naturally follows that such mechanical operations can only be controlled by even more complex electronic devices.

This electronically automated industrial revolution of ours which becomes more and more nuclear as far as power is concerned, will bring even greater complications. However, these problems are by no means insoluble. Our first responsibility is to attempt to understand automation.

President C. L. Foster of the Central Technical Institute has this to say about automation:

> Automation has been called the application of electronic brains to mechanical muscles. In a sense it is simply an improvement of our mechanized industry — the accelerating trend toward self-controlled machinery to perform jobs that now require men — a new way of making things and doing things automatically. It is, in fact, the Second Industrial Revolution.

Control through electronics is an extremely important and complex component of automatic production. So successful have experts become in this area that the disparity between the measured value and the desired one can be utilized to process itself and thereby correct the error. For example, when

there is a difference between the measured thickness of rolled sheet steel and the thickness desired, servo-mechanism adjusts the rollers in order to produce the proper thickness. To insure control, factories are being designed for their controllability. Electrical relays which work interlocking circuits control the sequence of movements of machines and handling equipment in such a manner that successive operations are carried out in their proper order. Through machine control, it is possible to determine the relative motions of the cutting tool and the workpiece in order to remove the proper amount of metal as quickly as possible from the desired places.

Foster explains further that:

> This new technology, unlike ordinary mechanization, is based on a principle which electronic engineers call feedback — the ability of a machine or circuit to detect and correct its own mistakes while they are occurring.

Automation may well be described as a complex, much-inclusive component of the present industrial revolution. This intricate phenomena did not develop in a relatively short period of time. It has been evolving for many years, and we now know it as an ingenious combination of electronics and mechanical power.

Automatic assembly of complex products is being achieved by redesigning a product, or modifying the manufacturing process, or by doing something through both approaches to the problem. For example, the manufacturers of electronic equipment have utilized the painted circuit technique. Paint with a metallic base is sprayed on plastic plates to form the wiring and other components of the electric circuit, all of which is then completed by the insertion of the tubes.

Wilbur F. Murra of the National Education Association Commission on Educational Policies has dwelt rather pointedly on some consequences to be expected from automation, singling out the part electronics will continue to play in automatized industry:

> Tomorrow's automatic factory will replace human robots with electronic robots, eliminating to a large extent semi-skilled and unskilled workers, but heightening the demand for engineers and production managers to create and use the vital automatic devices.
>
> It is at the upper end of the occupation scale that the manpower shortages exist: highly skilled technicians (in electronics for example) executives and supervisors, and scientists, engineers, teachers, social workers — and professiona generally.

### The Automated Manufacture of Electronic Equipment

The manufacture of electronic equipment has been automated with astounding rapidity. Automation in this all-important area of endeavor was expanded 275 per cent from the year 1947 to the year 1952. Automated plants for the production of electronic equipment will become even more essential as automation spreads throughout the world. Naturally, the increased manufacture of such equipment will mean more jobs for more people.

In the year 1958, Dr. L. T. Rader, the General Electric Corporation expert on automation, estimated that the handling of materials accounted for fifty per cent of all labor costs in the manufacture of many products. Engineers have naturally concentrated their efforts upon this phase of the production process, for the rewards have been great wherever materials handling has become automatic. Of course, the ultimate in this area of the automated process is to develop more factories where no human hands touch the materials throughout the entire manufacturing process. While the Ford Motor Company pioneered in the automatic handling of materials there have been early pioneers in other areas of production, as well.

The Poultry Producers of Central California automatically separate eggs according to 48 combinations of size and weights. The eggs are not only separated according to size, but they are given a shell-protecting coating before they are packaged, all of which is done automatically. The electronic equipment employed in the total process of handling the eggs provides a complete written report of the day's total egg output according to the various grades.

Food plants are making good use of electronic equipment. For some time it has been possible to take an order from a retail grocer and to feed it into an electronic machine. An automatic conveyor is thereby set in motion which delivers the proper number of cases of each item from the various piles in stock. Thus, the order is assembled and baled automatically for prompt shipment.

The Minnesota Mining and Manufacturing Company of St. Paul, Minn., pioneered in the automated manufacture of sandpaper with an initial plant 970 feet long. Machine speeds, the grain of the abrasive and the viscosity of the glue are all electronically controlled. The glue and the abrasives are automatically spread and beta rays check the uniformity of the coatings of both on the paper or the fabric.

Already in the year 1958, electronic equipment was so far advanced that the exploration of the moon and nearby planets was literally assured. To land a human being on the moon for exploration purposes and to return him to earth safely would require a rocket engine with a thrust of one to two million pounds. Thanks to the rugged and very small electronic devices, the lack of such rocket engines did not delay early exploration in outer space. Our less powerful rocket engines were capable of carrying the very light electronic equipment into outer space which transmitted valuable information back to earth.

# Design in Industrial Arts

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Is design important to industrial arts? If so, how shall a teacher use it?

Design is not another subject: this stands out clearly in our experience.

A college shop man once said, "There is no room for another thing in our program." He is right from his point of view. The common concept about teaching shop design is in a cloud of unsure feeling, first because of fear, which seeming contradictory theory does not allay, and then because of hunger for the truth about it; one pulling left, the other right. There apparently is nothing definite and authoritative to be found that begins to clear the atmosphere and that gives an understandable basis for its forceful use. Thus the haze continues, and teachers are not shown the way out. What one man designs in good faith and to the best of his knowledge is belittled by another. Where is the solid ground? The fact that shop is a "doing" and a "building" process in learning stands out clearly and sharply in

Pouring colored Castoglass into ¼-in. wired spaces

the minds of shop men, and that is well: it is the basic truth about industrial arts and must remain so, but, design in its relationship to creative shop work must be just as clearly seen.

Design is not a phase of production: it is inescapably an integral part of the product: it is the form of production. Design is not a phase of industrial arts: actually it is industrial arts, though those who do not seem to know the reason why, say openly, the subject has recently been given attention all out of proportion to its worth in education. Others, and I think they are in the majority, say, design is a neglected and misunderstood subject for which the department needs usable knowledge.

### What Is Design?

Design, only partially understood by the teacher, had better not be mentioned in the shop. And yet, the feeling persists that design must be a tangible reality in his shop. The teacher who feels himself most helpless is probably the one who feels his limitation most keenly. Design, he suspects, is more to the boy than he sees on the face of it.

Design which is fully understood by the teacher is a power in the shop. It has many implications, even when it is merely present as an example. Its high professional quality (when it has that) is a silent force, representing authority. This may hardly be a matter of knowledge to one who has not dealt with it; but it is a fact that genuineness is known, even to the amateur, who it seems, is intuitively able to differentiate between the real and the counterfeit, even sometimes when the latter misses the mark of the professional by a small margin.

This has probably all been said before, but it is a fact in our case. The most conspicuous fact about the persistence of the design question is that there lies underneath our thinking a feeling of deficiency or of out-of-tunement with the thought of the present trend that must be righted. Teachers feel this lack clearly. Some have made earnest effort to gain a working knowledge of design, reading books on the subject, taking courses in design, and still there remains a lack of it. This need not be, and the means to usable knowledge is not beyond every man's comprehension, though they may approach it with misgivings.

First then, what is the responsibility of the shop teacher in respect to design? For what reason shall he become design-conscious? It is not that he should teach it as a subject: it is more than that: design should be an integral part of the teacher's thinking. It should be as familiar to him as his hand. His design is his thought: it is the order of his living. He need not say a word; but the things he does, the patterns he places before his students, the remarks he casually makes, the manner in which he introduces his subject, the type of projects he proposes, and the work and reading matter he displays, are open evidence of his understanding. Often, too, the occasion is right for a direct reference to design, and there are times when an explanation of principle must be given, but I have never found it necessary to hold a discourse upon it. The boy learns more by direct "doing." In one of our best design lessons, when students have finished their small coffee tables and they begin to cover their tops with pattern outlined in ⅛-inch brass rod, filled in with colored polyester resin, the direction as to color harmonies, space relationships, and movement of form does not exceed two minutes of on-the-job explanation. I purposely give few directions to begin with, but I call the class to see the first indication of compliance with the principle (or the reverse) on a table top in process of being made. The ability of students to follow is more often than not underestimated. Their natural abilities to design is surprising to any who have not worked with them. In any case, the man directing must be an authority: he must know, and live design.

The important point is that design is a symbol. Aesthetic freedom or the enjoyment of the seven arts is a mark of maturity in our civilization. This applies to the teacher. Everything for which our culture stands and for which it has fought through countless centuries is of an aesthetic nature, and all technical achievement ends up in life as an aesthetic gain. It is the badge of culture and the end of a balanced life. Without it there is no balance: therefore, the hunger for refinement in the race. All feel this endless reservoir of kinship with something superior and nonmaterialistic. If the opportunity is not given students to balance the technical with the aesthetic, our effort lacks balance as it also lacks contact with all creative industry, vividly evident in the present trend. Why would you guess that the businessman, at the zenith of his maturity collects great works of art, or valuable first editions of great literature and drama: why does he sponsor symphony orchestras, public art exhibits, and collections of cultural treasures such as significant architectural works or objects that mark the high attainment of man in any field? The answer is, he craves that which strikes a balance with his intensive industrial activity.

The industrial-arts require balance. That is the reason much has been said about design. The department is overweighted in a sea of materialism, enough to drag the ship under. Were the old pilot still aboard, I could easily imagine John Dewey take the helm and turn the prow around into the stream of today, ordering much of the leaden cargo overboard to lighten the wooden hull. Industry has thrown out heavy materials for light, and along with it, the traditional ways, and it has taken aboard the best industrial design pilots in the land. Thus their ship rides high and fast, and none can deny that their products do combine technical precision with aesthetic authority: a matter of balance that all feel who purchase them.

Design would not be so important if it were not for a world of hunger for balance. Balance is attained by association and work with both the technical and the authoritative in design. Nor is obsolete design authoritative. Nothing reaches that height but the "now" in design, and since design never rests but always moves on to new forms and new expressions, "now" is an advancing term — never static. This places an additional obligation upon the teacher. Design is "now," each advancing day, and the teacher must advance along with it or be "stuck" with "old stuff"

Coffee table with acid- and alcohol-proof resin top

before long. Button shoes mark a period. There was a time, until recently, that "manual training design" had earned a reputation, not to be desired. It was thought of by citizens generally as a separate and distinct species, not allied to time, trend, or conformity with the public taste. It had its way of saying, "The public be damned." It was merely amateur effort, concocted of inexperience. Many were the remarks and slurs on all levels of life. It is with a sigh of relief that we have passed that stage, only because of our hunger for the aesthetic; indeed, an increased and persistent search for truth in design is our hope.

### Technology and the Arts

Clarence B. Randall, The Fund for Adult Education Lectures under Harvard College sponsorship, and former Chairman of the Board, Inland Steel Company, says in his first talk, "To many my ideas will seem to come strangely from the lips of one whose entire business life has been devoted to the production of steel, but they are strictly a function of that life. . . . It is the balance between the discipline of technical education and that of the liberal arts that interests me. . . . There is danger that education will get topheavy with technology . . . our ultimate superiority may rest upon maintaining in our country the proper balance between these two approaches to the education of our youth."

Other businessmen have repeated this message so often that we are beginning to give it serious thought.

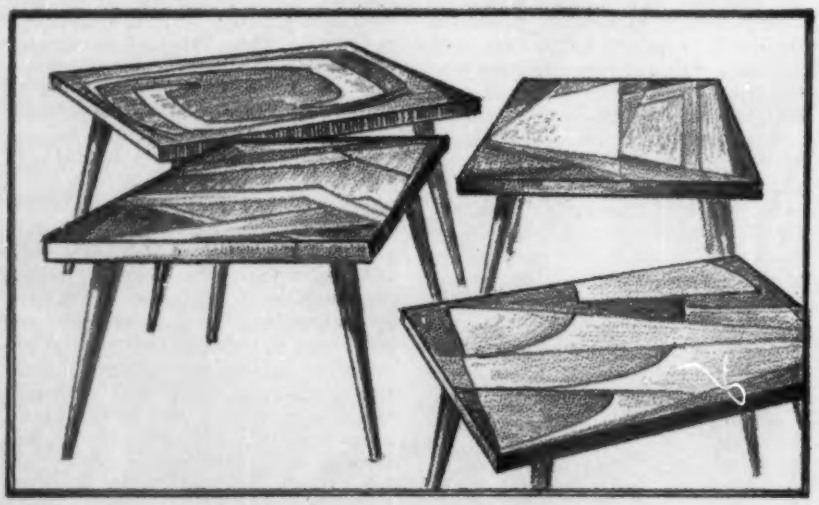
Industrial arts has one devotion: to skills alone. Narrow views are a danger in all specialization. As a matter of fact, as I understand our responsibility to the public at large, industrial arts should not be a specialization but a broadening — this is in contrast to vocational education. Life does not accord one band in the spectrum such importance as to fill the view. A lesser band of a technician's ability can be credited to skills training, even though ever so necessary, and none will say it is not important to a point. After that, it is training of the spirit, an ability to weigh, to judge, to decide, to concede, and to act. For the latter, the technician, the engineer, the architect, and the machine operator need a liberal view. He needs wider concepts, greater appreciations, greater hungers, and sharper convictions on the aesthetic order of life to arrive at superior ultimate decisions. Shop design is the necessary doorway into hungers that direct youth to wider view and therefore to greater intelligence.

Those who do not want to concede this unique position to design, withhold the truth and add to existing confusion. I cannot forget a certain young man whom I knew well who had slighted his shop experience by getting himself into the editorship of a school paper. He was a musical genius and had other wide interests in the Humanities. One day found him needing college money. The times were hard. He camped on the doorstep of a plant that seemed sympathetic to his need and at last was taken on by a foreman who, without preliminaries, gave him a milling machine job of more than ordinary difficulty. It developed later that the young man hardly knew what such a machine was. The work given him demanded special precision, so much so that the foreman had operated the machine himself, not entrusting it to his own men. This foreman told me later of the intelligence, care, and facility with which our Humanities trained boy had delivered perfect work on schedule.

The above is not an isolated story. You know of others. Education which builds practitioners of more than ordinary caliber is that which builds the broad view, where skills as such are secondary, though therefore not less valuable in their place; they are secondary to the ability to see and weigh with high intelligence.

### Designwise Teachers

Design is important to industrial arts when the teacher thinks design-wise. A median or a borderline position is a confused position and has no place in education. A teacher who is design-wise, that is to say, a teacher who thinks, sees, and feels design as a matter of habit, is a superior teacher, for reasons



Coffee tables in Korena wood with resin top

given in a previous article. To be so trained is not a hardship; no more in fact than to be trained to know all the names of national league baseball players together with their batting history. Boys acquire this ability by contact with the subject. What is more natural? There are no courses in baseball history. There are merely two requirements, an interest, and the sports column in the daily paper. This is a basic learning pattern. To be an authority, associate with authority. That is all of it in a nutshell.

What shall an untrained teacher do, design-wise? He can positively make himself an authority in the span of a year or less by the process of attachment, precisely as the boys learn baseball history. This has been discussed in previous articles, but its implication is so far-reaching that a review is in order.

If the teacher possesses a sincere sense of needing to train himself and his decision is to become an authority, his battle is won. He will know that useful knowledge does not come without disciplined effort. He must rule himself with an inflexible purpose to pursue his course with even regularity and with unbroken continuity, until he has mastered it. The teacher will then be in the position of a man from a well-known art school in Chicago who was just taken on by an Interior Design firm, the man knowing very little about furniture and furnishings. His formal training was wide and general. Interior design is specific. In this, it is much like industrial-arts project design. The man in question proceeded immediately to fit himself into his need, which was to know specific design thoroughly and with the facility of a professional. He gave every spare moment to leafing through professional interior magazines, thus becoming acquainted with trend productions and always more familiar with their features and detail, until, with the advantage of full scale examples all around him, he became a high authority on the subject in a short time. He dealt with trend styles first, and added the later period styles to his fund of knowledge together with their typical fabric patterns. This is more than a teacher needs to be concerned about because it is not his immediate need, but the process of learning is fundamental.

In the teacher's self-training, let him first subscribe to or arrange to have available three or four top-flight professional magazines, such as *Interiors*, *Craft Horizons*, *Domas* (an Italian publication of high quality), *Design Quarterly* (of the Walker Art Center, Minneapolis), and *Arts and Architecture*. He will also profit by perusing current brochures of the Herman Miller Furniture Company of Zeeland, Michigan; of the Knoll Associates, New York; and of Directional (Paul McCobb), New York. With these as the price of his tuition, let him begin his adventure with undeviating regularity, once a week, twice a week, or at his discretion at stated intervals, first by paging through each issue, having no set objective except to become acquainted with trend types, passing over all traditional copy work of which some trade magazines still show a certain amount. Later, when the perspective views of contemporary furniture are quite clear, the purposes in leafing through the monthly issues change, noting typical details. This procedure is more profitable if attention is concentrated upon one detail at a time, such as form of table legs, and next of table top shapes, and then of top thicknesses, of top overhang, chair forms, cases, case trim, case legs, etc., in order. The study actually takes little time, and the time should be enjoyable, looking through some of the best publications of our time. In six months to a year, the teacher will feel his knowing, and it will give him the authority and confidence, not to mention the deep gratification of having acquired a professional outlook in which he feels at home and freely conversant. Such training cannot come through books or courses; as a matter of fact, training school design courses would profit by using this professional proceeding. Sketching from the source magazines would speed the learning and impress their forms indelibly upon the memory.

In the end, after all that has been said fades into the large panorama of life, the teacher will have become, not a design teacher, but a designer-teacher whose pattern of teaching, whose words and emphases, and whose goal and product will color to the tone of his widened understanding and of new hungers that his studies have stirred into being; hungers for the balance in life that spiritual and aesthetic interests add to the technological.

# Industrial Education in the Wake of the Satellites

**CLARENCE SPARKS**
Community High School
District No. 152
Woodstock, Ill.

In a recent interview with Dr. Milton S. Eisenhower, *U. S. News and World Report* gives Dr. Eisenhower's answer regarding the effect of Russia's Sputnik on American education. His answer: "It, more than any other circumstance in my lifetime, has caused the American people to look critically and — I hope — thoughtfully at our entire educational enterprise."

This is no doubt true, and the important fact to note is that the American people have had their critical eyes opened. Many individuals and groups, both in and out of education, have been looking critically, and thoughtfully, at our educational system for some time. Sputnik has simply triggered a potential that was already in a cocked gun.

A second thing to note in Dr. Eisenhower's statement is his implication that perhaps all the critical looking will not be thoughtfully done. It is at this point that educators, both great and small, have a duty to perform. It is the duty of those in education to furnish the American people with all the practical, experimental, and theoretical information on education that has been accumulated through the years. This material must first be assimilated and re-evaluated and then disseminated in order that the American people can look critically, and with thoughtful dignity, at their educational system.

If the above premise is acceptable, we in industrial education have a duty to perform also. We are educators, great in our own minds at least, although perhaps becoming smaller in the eyes of some people during the first surge of Sputnik's wake. Great or small, we have the right and the duty to look critically and thoughtfully at the American educational enterprise.

The thesis of our platform: (1) Life in an industrial society requires a

knowledge of materials, methods, and processes used in industry. (2) This knowledge is but one comparatively small but important part of the information that man needs for coping with, and enjoying to the fullest, his brief sojourn on earth and, or, outer space. (3) Satellites are not put into orbit and space ships into flight entirely by pure science and mathematics. Skilled hands will always be necessary in order to apply science. (4) Skilled hands become more skilled when they are coupled with a mind that holds much information of a scientific and mathematical nature.

There is nothing really new in this thesis. It has been our standard for many years. That does not mean that we are entirely right. Our basic philosophy is still sound, but we must perhaps restate it to better fit the times. That our industrial education program has never operated to our complete satisfaction we are all quick to agree. We have always had to be flexible in the application of our philosophy. We have been forced to make concessions that literally tore the heart out of our well-laid plans. We stood for our convictions then and we must do so now. We changed some convictions then and we can do so again.

The things that are now being seriously advocated will either strengthen all of education or they will really strengthen no part of it. Education in a democracy is a total thing. There is either a balance or a deficit. This is not saying that education in a democracy must be a leveling process. It is saying that, if one group is made to gain at a corresponding loss to another group, then nothing has been gained for the total group.

During the current re-evaluation of our educational system, we in industrial education must grasp the opportunity that is presenting itself. It is a sad, sad fact that many of our shops have been used as *dumping grounds*. What could have been laboratories for creativity and learning became activity rooms for those who had been so shortchanged all along the line that they had become quite inactive mentally. Yes, some of these boys and girls were rehabilitated in this process. This was because some of the facilities and methods used in our industrial laboratories (shops) lend themselves to such flotsam operations.

In this wave of ability groupings, let's try for some grouping in our department. Let's have more classes that are established primarily for the students who are in need of remedial help. In the eyes of many students and parents, our school shops have come to be recognized, or at least considered, as places for the educational misfit or outcast. Many students have shunned the courses in industrial arts and vocational subjects simply because there was a stigma attached, not because one *got his hands dirty* but because of the stigma that had become attached to the majority of students who end up in our shop classes.

While the current hurrahing for science and mathematics is going on, let us be alert in pointing out that shops are basically laboratories of applied science and mathematics. The potential for teaching and learning that is inherent in our shop facilities has never been fully recognized or utilized. It is true that the conventional way in which we have used these facilities has done little to prove their real potential. For this reason we must be the first to show both the desire and the ability to break away from some of our ideas and actions.

Of course we in industrial education can do little to change our programs and methods unless those who are responsible for other parts of the educational enterprise are willing to free themselves from convention. What some people are now advocating seems pretty much like the re-establishment of courses and methods of fifty years ago. Undoubtedly, we did make some mistakes as we changed our growing educational system. Perhaps we did throw out some of the good, but most of us believe that we managed to hang on to the baby.

It goes without saying that we cannot offer and expect many students to take all the courses and subjects that different groups will advocate. It is also quite reasonable to hold that there is a skeleton, a basic core, of facts and information that is necessary for the development of a person's powers of reasoning. We are in fairly close agreement as to the contents of this core of information. In terms of conventional subject headings we are not too far apart. It is in the realm of "where, when, and how" that we are farthest apart.

When it comes to the questions of where, when, and how, most of us are unable to remove ourselves far enough from conventional practice to come up with any different answers. We continue to think in terms of subjects and years. Each division of information becomes a subject that seemingly has little relationship with other subjects, or even with its own subdivisions. Each subject must be taught five hours a week for thirty-six weeks. It is time, perhaps, that we use the scientific method in finding a better answer to these questions of where, when, and how.

In our industrial-arts courses of the short-term, exploratory, rotation type, we have broken away from the conventional semester and year periods. Assuming that these short courses are, or could be, good, are there too many reasons why the idea of short courses couldn't be used in other subject areas? Indeed, is it unthinkable that certain science and math courses might be combined with some experimental and practical laboratory experiences on a rotation basis? The colleges have long used a rotation system in the laboratory-lecture divisions of their science courses. This has enabled them to keep their laboratory facilities in more constant use. This, of course, enables them to have larger and better equipped laboratories.

Perhaps the time has come for the high schools to have one or more central laboratory rooms. Such rooms would be equipped to give the students opportunities for learning on an experimental and practical basis. These rooms could be in charge of special technicians who would assist the regular teachers and their students during the lab periods and at other times made available to the students. Properly equipped, such a laboratory could be of service to many classes other than those in science.

Industrial education is here to stay, and we need have no fear of its being swamped in Sputnik's wake. Ours is an industrial world, based on pure and applied science. Education is changing. Let us change gracefully where necessary — and all will be for the better.

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If the leather or other protective material on your camera has become loose, cement it down with pure, white shellac. Apply some to the back of the material, then press it tightly back into place and hold for a little white. — *Shellac Information Bureau.*

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Since NATO was founded in 1949, European members of the 15-nation alliance have paid for 85 per cent of the total cost. They have supplied 60 per cent of the equipment and supplies used by European NATO forces and have provided the major share of the manpower. — *Wisconsin Military District Information Office.*

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Sculpturing in wood is growing in popularity. After the figure is carved, it should be preserved by applying a thinned coat of fresh, white shellac. A second coat, when the first is dry, will add beauty.

— *Shellac Information Bureau.*

# Industrial Arts and Vocational Education

JOHN J. METZ, Editor

## PRINTING EDUCATION WEEK

THE International Graphic Arts Education Association designed and printed a striking 1959 Printing Education Week poster which was being conducted in honor of the printers' patron, Benjamin Franklin. The Printing Education Week was celebrated January 11 to 17 this year. The poster was designed and printed in the department of printing at the Rochester Institute of Technology, Rochester 8, N. Y.

The printing industry is the sixth largest in the United States, and its leaders are fully aware of the need of keeping up a flow of fully trained personnel to staff the more than 40,000 printing plants of our nation.

The sales agencies for Heidelberg automatic cylinder and platen presses recently conducted a study of graphic-arts educational and training facilities. Their study shows that training is available in both general and vocational schools that are privately and publicly supported. Special short- and long-term evening courses are offered by various graphic-arts and industrial suppliers, and many printing plants conduct *on-the-job* training. Then there are many scholarships available to graphic-arts students. Associations, schools, and individual firms offer these and publish the fact in printing journals. The National Graphic Arts Scholarship Trust Fund of the Education Council reports that at least five 4-year competitive scholarships will be awarded, at $1,000 per year, and four at $500 per year — so that there should be at least 36 in force at the end of four years.

The latest issue of the Carnegie Institute's School of Technology catalogue lists 24 scholarships open only to students of the Institute's School of Printing Management. Catalogues of other educational institutions also list scholarships of various kinds.

It is difficult to say just how many graphic-arts courses are available in the United States. Probably the most reliable statistics are those compiled by the Graphic Arts Education Council and the International Graphic Arts Education Association in a survey several years ago. The survey committee had mailed 3034 questionnaires to schools which were believed to conduct some type of graphic-arts education or training. These courses covered work in elementary grades through trade schools, technical institutes, vocational schools, and colleges. One thousand, one hundred, and nine completed questionnaires were returned and analyzed. The findings showed that most of the schools that teach printing are in the industrial-arts category. Elementary schools, junior and senior high schools comprised 67.7 per cent, and accounted for over 70 per cent of the total number of students covered by the study. Hand composition and hand platen presswork were the subjects named by 90.7 and 95.4 per cent of the schools respectively. Letterpress cylinder operation was taught in 22 per cent of the reporting schools; and silk-screen in 42 per cent; bindery operations in 57 per cent; and machine composition in 30 per cent.

The committee that conducted the study deplored the fact that most of the schools that reported had no formal relationship with the printing industry. They felt that there ought to be a much closer relationship between school and industry, since 1109 schools estimated the value of their printing equipment at over 22 million dollars, involving 1600 teachers and 77,000 students. In the 5 years that have elapsed since the study was made there has developed a closer relationship between industry and the schools offering graphic-arts training.

Industrial arts and vocational education should do their utmost to have the relationship between school and industry intensified. The mere acceptance of the importance of printing does not assure a supply of trained workers. This is brought about only by an increased collaboration of school and industry in furthering the cause of printing education.

Our growing population, new uses for the graphic arts processes, the introduction of technological improvements, all require more and better trained personnel. That means better printing education, and school and industry must face this responsibility, which is theirs, and furnish more of it in the future.

## THE END OF THE FIRST SEMESTER IS APPROACHING

THE major part of the first semester has already passed. It is time to see just what has been accomplished. The students who have been in your class since September may have done remarkably well, or they may have had very poor success. Can you do something to perk them up? Probably the students will be only too glad to make an extra effort to acquire the information you tried so hard to impart to them.

On the other hand, you may have had the good fortune to have a class of bright youngsters who have had good success with the work you gave them. A simple review will be all that is necessary to prepare them to obtain a high passing mark. It is well, however, to take no chances and give them all a review.

You may have a supply of tests that you have previously used. If you do, it will take but a short time to prepare a test or examination which you can use with your present students.

The following lists a number of tests in various subjects which appeared in INDUSTRIAL ARTS AND VOCATIONAL EDUCATION in the past five or more years. Most of them are out of print but you may find them in the libraries of high schools and teacher education schools.

Diagnostic and Prognostic Test for Print-Shop Classes, Isadore M. Fenn, Feb., 1947, p. 65.

General Printing Project Test, Israel Bensman, Mar., 1947, p. 140.

Test for Drafting Room, W. C. Ford, Apr., 1947, p. 164.

Performance Test — Basic Electricity, James L. Holsinger, May, 1947, p. 206.

Test in Wood Consumer Goods, W. H. Bowers, June, 1947, p. 244.

Introductory Woodworking Test, Paul N. Wenger, Apr., 1948, p. 169.

Recording and Weighting Industrial-Arts Grades, John F. Friese, June, 1949, p. 223.

Test on Woods and Their Uses, Amos G. Williams, Mar., 1952, p. 61A.

General Farm and House Wiring Test, James A. Sayer, May, 1956, p. 30A.

Achievement Test for Ninth Grade General Metalwork, Donald G. Lux, Oct., 1958, p. 20A.

# Rain-Making Experiment

**WILLIAM J. DOUGLAS**
Technical Service
Denver, Colo.

Controversy on rain making via cloud seeding still rages. Recently, the U. S. Weather Bureau announced the setting up of a series of controlled experiments in Washington for the purpose of measuring results. The Bureau still maintains a cautious attitude while private cloud-seeding companies, who have been seeding clouds on a large scale for the past five years, are confident of a long overdue vindication of their stoutly maintained position that cloud seeding really works.

They point to their cold box experiments — originally conducted by the General Electric Corporation — as visual proof of what happens in a cloud when it is seeded with dry ice or silver iodide. All that is necessary, the professional cloud seeders say, is for Nature to reproduce the same "super cooled" cloud that can be formed and "seeded" in a cold box. The ice crystals which are produced by seeding supercooled clouds would become raindrops when they fall through the warmer air near the earth's surface. In winter, snow crystals.

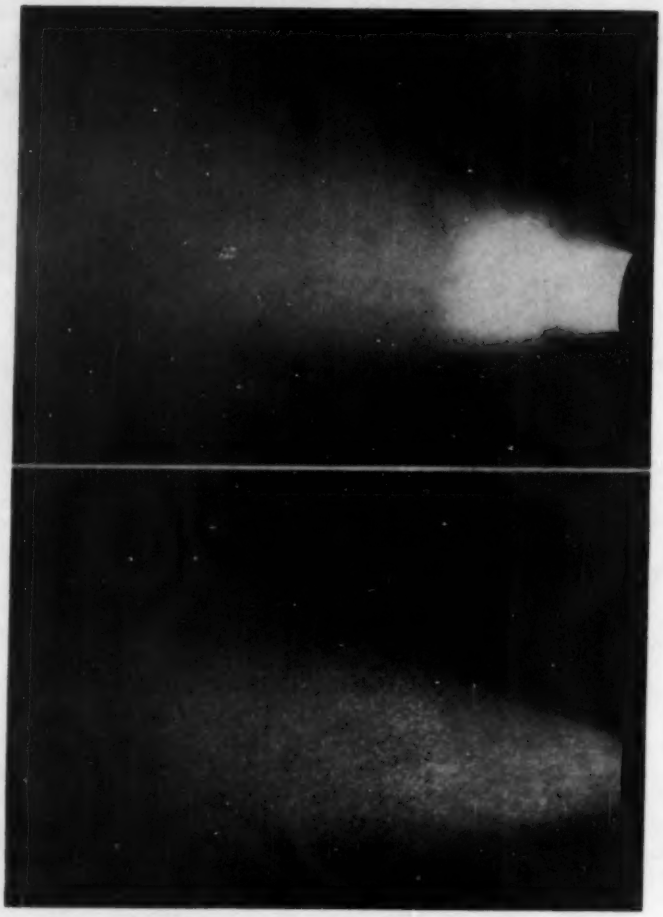
Here is a simple experiment that reproduces the effects of seeding clouds with vaporized silver iodide:

### Equipment Needed

1. Horizontal (lid on top) deep-freeze box.
2. Black crepe paper or corrugated paper box, painted black.
3. Two-cell flashlight (or larger).
4. Thermometer that registers at least -10°F.
5. Kitchen matches treated with silver iodide.

### Procedure

1. Line inside walls and floor of freezer with black paper. (Black painted box may be substituted.)
2. Place thermometer in freezer and allow temperature to drop to about 0°F.
3. Blow two or three breaths into black box. The water vapor is cooled rapidly and will cause a supercooled cloud to form



Upper picture — The super-cooled cloud formed in the deep-freeze box as viewed in a beam of light. This cloud was formed by blowing several breaths into the deep-freeze box. The low temperature in the deep-freeze box cooled the moisture laden air blown into it sufficiently to produce condensation. This condensation formed the cloud which is at a temperature far below the freezing point of water. At the time of this picture, the temperature was 0° Fahrenheit

Lower picture — The ice crystal cloud which was formed immediately after seeding with Silver Iodide. This picture was taken one (1) minute after the preceding one. During the interval between pictures, a Silver Iodide impregnated match was burned near the bottom of the deep-freeze box. At the time of this picture, the temperature was 3° Fahrenheit. Burning the Silver Iodide impregnated match in the deep-freeze box produced this rise in temperature. The addition of moisture by repeated blowing of breath into the deep-freeze box will cause the crystals to grow larger.

which will be visible as fog when the beam of the flashlight is directed through the cloud.

4. Strike an untreated match and, using this, ignite a silver iodide treated match. Hold it near the bottom of the cold box. Extinguish as soon as the wood begins to burn normally.

5. Add more moisture to the box by repeated blowing of breath.

### Observed Effects

Before cloud is nucleated, it will have a foggy appearance when seen in the beam of the flashlight. Immediately upon burning the silver-iodide impregnated match, the released silver iodide crystals will cause a change in state from a cloud composed of water droplets to one composed partly of ice crystals. The crystals will be clearly visible as they glitter in the flashlight beam. As more moisture is added (by continuing to exhale into the box), the process of sublimation will be demonstrated. The crystals will continue to grow larger and larger as they draw on the added supply of moisture. If further evidence is desired, these crystals can be collected as they settle on a glass slide and viewed through a microscope which is being maintained at the same cold temperature.

Be careful that the temperature of the cold box is not raised above 20°F. by excessive blowing of breath into it.

### Reasons for Observed Effects

Water can be supercooled, i.e., retain its liquid form, at temperatures colder than freezing. Under such conditions, it furnishes a very favorable source for the growth of ice crystals which form around the very small silver iodide particles. These silver iodide particles are the nuclei around which the ice crystals form and grow. The glittering seen in the shaft of light is reflection of the particles of light from the different small mirrorlike surfaces of the ice crystals.

The water Resources Development Corporation will supply silver-iodide impregnated matches without charge to teachers interested in performing the above experiment. Address requests to the Water Resources Development Corporation, 460 South Broadway, Denver 9, Colo.

### Pix

1. Super-cooled cloud.
2. Impregnated cloud showing crystaline formation.

# Upgrading Industrial Arts Through Professionalization

**C. NELSON GROTE**
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State Department of Education
Frankfort, Ky.

Most of us in the field of industrial education are cognizant of the planning involved in modern industry. When a new item is being molded into a useful product, every process is planned, every step is analyzed, lost motion is decreased, modern methods are employed, and every effort is utilized to conserve waste, in order to turn out a product so designed as to be in demand by society. Does an industrial product demand more attention than a student? Isn't careful planning also essential in order to produce the type of educational program necessary to mold a student into a happy and useful product in our society?

Why aren't we doing it? Why do we find a majority of our teachers teaching without a carefully developed plan? Why would 14 out of 200 industrial-arts teachers, when asked to state their objectives, list none or omit the question, 49 list one, 20 list vocational objectives, and only 5 out of 200 acknowledge that industrial arts contributes to general education? Are teachers ignorant of the purpose of their program or are they confused? Why do industrial-arts teachers impose "carry-over" objectives, methods, techniques, and projects from college upon their students at the junior or senior high school level? Do our graduates really understand such terms as, "aims and objectives," "means to an end," "psychology of learning," "individual differences," and "grade placement"? Where actually does the problem begin? What are the implications for practice teaching? Have they been adequately and professionally prepared? Should the state furnish recommended or sample courses of study, and what are the problems of such a plan? Are there factors on the job that contribute to the problem? What are the implications for in-service education?

Let us begin by looking at a 1955–56 state survey which clearly indicated that the 200 industrial-arts teachers were better prepared than teachers of other subject areas in the same state. Only 11 per cent of these industrial-arts teachers did not hold a bachelor's degree while 28 per cent had earned a master's degree. The problem must go back further. Perhaps, in some cases, the problem may rest upon misconceptions of the program prior to their entering college. Perhaps we need a carefully conceived orientation program at the freshman level where we can begin to introduce some of the basic philosophy as well as purposes of industrial education, in order that each subsequent experience may be applied to a new frame of reference, rather than to a stigma of misunderstanding, tradition, and precedents.

We know by observation that most teachers teach as they were taught, rather than, in some cases, the way they

were taught to teach. If this is true, should we be more careful of the examples set at the teacher training level? If we expect teachers to plan curricula, use sound teaching principles, organize their laboratory, follow approved classroom methods and procedures, and to evaluate effectively; should we as teacher educators demonstrate our enthusiasm by applying approved practices in our presentations?

In many colleges and universities, students are ending their junior year or are beginning their senior year before they are exposed to any applied teaching. Then in a professional course or two, students are expected to relate and apply three years of unrelated work to teaching. At this time, they prepare, in many cases, their first course of study, written instructional materials, design and select projects for teaching, develop evaluative procedures, do their first demonstrations, develop teaching aids, and collect professional materials. Is this procedure the most effective way? Would it be more meaningful if students were actually introduced to these problems in each class by professionalizing the laboratory courses? Would this procedure differentiate the uniqueness of purpose between teaching students who are going to be teachers and teaching students in general education? If students were involved in relating experiences to teaching, would this provide the missing link between the man with manipulative skills and technical knowledge, and the professional industrial-arts teacher who must be adept in applying these skills and knowledge to a teaching situation, as well as organizing, developing, and administering a sound program of industrial arts? The author realizes that there are many teacher training institutions across the nation who are employing these professionalization techniques as well as many more.

There are those who will say that by professionalizing the laboratory courses, time will be absorbed which would normally be spent in the laboratory, and as a result, will curtail the amount of work accomplished. This will no doubt be true — perhaps we need to re-evaluate advanced laboratory courses in the light of the real needs of professional teachers. What phases of an industrial-arts teacher's professional preparation is he most likely to develop on his own, out in the teaching situation? What factors are of prime importance at the outset of his teaching career?

Usually a student's first major contact with his profession is in his practice teaching program. There is little, if any, question that when a student leaves the campus and goes into a new community for his practice teaching and works with a dynamic and energetic professional industrial-arts teacher in a real situation, that he will receive a vitalizing and stimulating experience. Teacher training institutions, in many instances, cannot or do not provide this opportunity. Practice teaching on campus, as generally practiced, is at best a pseudo situation. Therefore, it appears highly important that a carefully planned realistic practice teaching program be developed in every teacher training institution. What would be the advisability of placing a portion of the practice teaching at the junior level? Would some of our professional courses be of more value to students after this brief experience?

There is no attempt by the author to place undue criticism for all of the existing problems upon the teacher training institutions. Most college departments are competently staffed and have outstanding programs. Nevertheless, problems do continue to exist. There are many factors to consider in their solution. We recognize that teachers differ significantly and that no two teaching situations are exactly alike, due to many complexities. Would not such elements as local administrative support, community acceptability, professional status of the staff, precedents and traditions, affect teaching practices? Is conformity the professional way or the easy way? Can professionalization be achieved through a single experience or is it a continuous process?

Should the state departments of education furnish recommended course outlines or courses of study? When teachers haven't had the drive and enthusiasm to prepare their own, will they use effectively those supplied to them? Even in the few instances where they are used, the advisability of doing so may be questionable. Actually much of the professional growth involved in such materials is in the preparation. No course of study, regardless of the breadth represented in its preparation, is applicable to all programs. A similar problem exists when teachers borrow or adopt courses of study, re-copy a college syllabus, or even use personally prepared materials from a previous teaching position. Each program is unique, and if ready-made materials are utilized, they must be adapted to the given situation rather than adopted. Could it be that teachers do not see the advantage of course outlines, courses of study, and written instructional materials and do not know how to apply them to the educative processes?

Do we need a course outline in this era of modern educational theory? Does this mean that one who applies the teacher-learner process cannot also believe in organized learning experiences? When an important automobile trip is to be made, one usually plans every step of the way by carefully following a road map. The family, in most cases, will share in the total planning within established limitations. If we continue to make the same trip repeatedly, our reliance upon the map decreases. However, to avoid needless repetition and to seek new and better experiences, we begin to evaluate alternate routes that guide us toward the same ultimate goal. Does this analogy apply to both beginning teachers and teachers of beginning students?

Even though the teacher training institutions across the nation continue to make great strides in professionalizing their programs of industrial-arts education, we face a gigantic task in seeking ways and means of professionalizing many of our past graduates. Summer school has been considered as one of the approaches to solving this problem. Could it be that we are, in most cases, preaching to students who are already professionally *converted?* What about the teachers who never attend the traditional summer session? What is the most effective way? Would short intensive type courses, workshops, or clinics be the answer? To what extent should the responsibility for professionalization be placed upon (1) the individual, (2) local school in-service programs, (3) professional associations, (4) teacher training institutions, and (5) state supervisory personnel?

The author acknowledges that there are many factors and ramifications in the upgrading of industrial arts in the secondary schools of which professionalization is only one. All of the problems have not been listed — many questions are still unanswered.

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Among the stores and services available in the Pentagon are: a uniform and tailor shop, shoeshine and repair shop, barber shop, jewelry store, newsstand, bookstore, department store, dry cleaning and laundry shop, bakery, flower shop, and post office. A telegraph office, airline and railroad ticket agency and credit union are also located here. — *Wisconsin Military District.*

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Cardboard boxes make fine containers for bulbs. The box will last longer if given a thinned coat of pure, white shellac. Seed envelopes can be used as identifying labels by attaching them to sticks placed firmly in the planted ground. Both labels and sticks should have a preserving coat of the thinned shellac. — *Shellac Information Bureau.*

# Problems and Projects

## VERSATILE TRANSFORMER AND A FINE TEACHING AID

**HARRY J. MILLER**

**Gillespie Junior High School**

**Sarasota, Fla.**

The electrical teacher in the industrial arts or vocational shop who will take the trouble to build this simple transformer will find himself possessed of a source of endless experiments in the transformation of electrical power.

With its aid, a great variety of lessons may be taught, and the dramatic presentation of results will drive home numerous electrical principles.

It will save repetitious lectures on the subject of poor and dangerous, fire-breeding splices. This transformer will silently, speedily, and most effectively, drive home in a single demonstration the reasons for high-quality wire insulation and the disastrous effects of heavy currents riding over inadequate wiring.

It will show in one or two shop periods why magnetic fields behave as they do, and how commercial use is made of their behavior.

Its usefulness is only limited by the teacher's ingenuity in setting up a series of progressive experiments on a par with the level of the students that comprise his classes. Its versatility covers the wide range between an understanding of the simple effect of the magnetic field around a conductor, and the principles which underly the operation of the vibrator in a portable radio, a car radio, and the process of converting a 6- or 12-volt auto battery supply to the multi-thousands of volts required to supply spark plugs from the car's transformer — the ignition coil.

It may be used to demonstrate the manner in which industry uses current and voltage transformers to isolate measuring meters from the high potentials, and welding with low-voltage, high current transformers.

Over a wood core 1½ in. square, wrap a layer or two of waxed paper, then wrap on 24 turns of No. 8 wire as the secondary, using "Formvar" enameld wire. Next wrap a layer of insulating paper over this, then layer-wind 460 turns of No. 14 wire for the primary. Use string to tie the sides of the coil so they won't collapse, then withdraw the wood core. Use cambric tape to wrap the coil tightly; bring out a pair of leads from the primary and the secondary coils. Then dip the coils in insulating varnish and bake it in the ceramic shop's kiln.

For a longer lasting unit, varnish it again, and give the coil another baking.

Fill the coil and surround it with a laminated, soft-iron core of transformer iron abstracted from a discarded transformer; from a war-surplus piece, or from soft stovepipe iron stacked after cutting as in Figure 1.

Mount the assembly on a slate, asbestos, or other block of 6 by 6-in. insulating material, using spacers on the screws at each side to elevate the coil from its base. Slide sleeving over the leads, solder the wires into suitable lugs and bring them out to terminals.

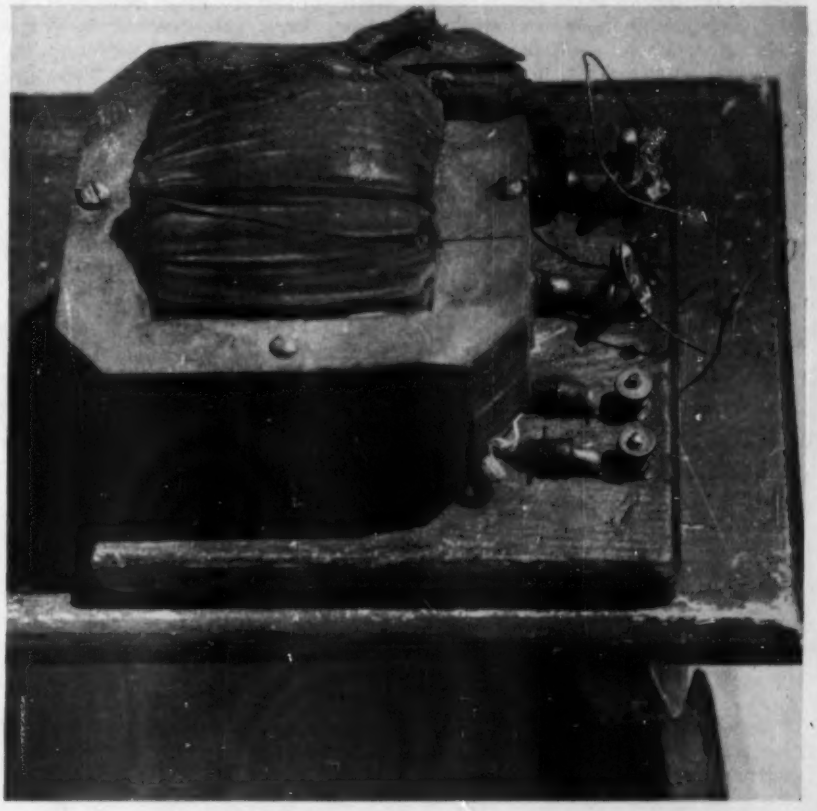
The 115-volt primary will draw about 5 amperes; the secondary will produce about 30 to 35 amps at about 8 to 10 volts.

As an example of what the transformer will do, make a loose, poor splice in a piece of bell wire, and connect it across the secondary, with the primary hooked into a 115-volt outlet. Because of the high resistance of the splice, it will be the first part of the wire to get warm, to glow, then burn apart — in a matter of seconds.

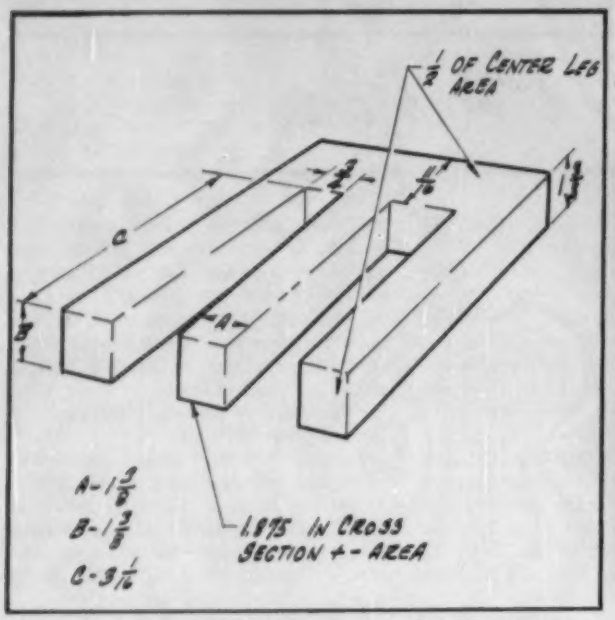
On the other hand, make a good, firmly soldered splice, and the wire will burn at almost any other place but the splice, proving the wisdom of preventing fires in wiring through proper splicing.

Again, hook a piece of annunciator wire across the secondary, and the heavy rush of current across it will make insulation and wire blaze up into fire almost instantly. From which is taught the lesson of wire-carrying capacity, since the slender No. 18 wire is unable to carry the load.

Now replace the annunciator wire with a loop of No. 14 rubber insulated wire, and clouds of smoke will immediately develop as the rubber melts and disintegrates and bursts into flames. Remove the charred remains and substitute a piece of No. 14



**Versatile shop-built potential transformer. Spacers over the long screws keep the bottom of the coil free of its base. Core is laminated soft transformer iron**



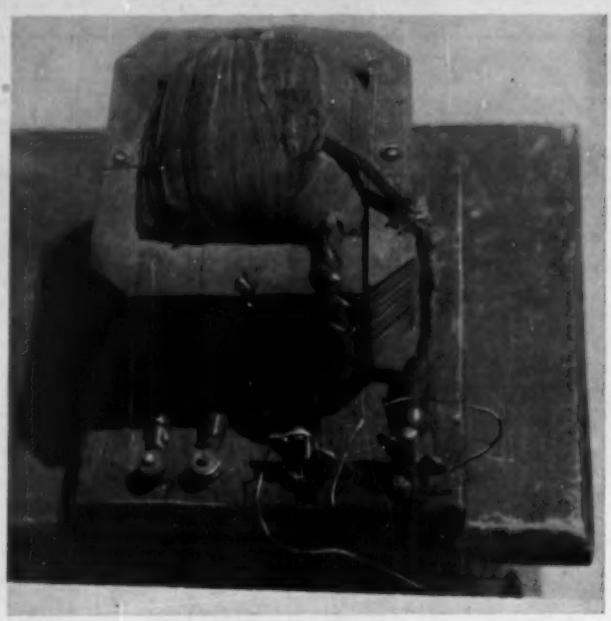



**Fig. 1 (left). The core. Fig. 2 (right). Note the pieces of bell wire looped across the low-voltage, high-current secondary. A moment after primary terminals (left) are connected to a 115-volt outlet, the poor splice in the wire makes it burn and sets the insulation ablaze, to prove the need for good splicing, wire of adequate size, and proper insulation**

with plastic insulation and note how this retards disintegration of the wire by reason of its better quality insulation components. This teaches that in the electrical industry, wire is no better than its insulation. Thus the above few experiments drive home the reason for the staggering spiral of home fatalities from electrical systems and appliances — undersized wire and poor insulation.

Place a loop of No. 14 wire across the secondary, cut it in two, skin the ends a half inch; plug the primary into the 115-volt supply, and touch the skinned ends together momentarily. The resultant fusion illustrates modern transformer welding as practiced in industry.

Connect a voltmeter to the secondary; measure the voltage; then have students prepare a graph and/or a scale so that the full reading of 10 volts in the secondary actually represents 115 volts flowing in the primary. Thus each volt in the secondary means 11.5 volts are flowing in the primary. It is in this fashion that low-reading voltmeters connected to the secondaries of transformers whose primaries are hooked to high line voltages, read the higher voltages, although only a safe and small fraction of the actual lethal current flows through the meter, whose scale is calibrated however, to record the higher quantities. Such instruments are called potential transformers and have their counterparts in current transformers which carry only a fraction of the high currents, while registering their higher value.

In the case of the potential transformer you've made, these serve to isolate the meter from high potentials. In the case where used as a current transformer, as small as the indicating coil may be in the ammeter hooked thereto, although it carries a minor amount of current, its scale, too, has been calibrated to read the high currents. It is in this manner that industry's heavy power measurements are made, and this shod-built transformer graphically conveys the idea.

As any electrical teacher knows, transformers are reversible in operation, which means 8 to 10 volts of alternating current may be applied to the secondary, which then becomes the primary, and a voltmeter across the terminals of the 115-volt winding will then show students how the transformer steps the voltage up.

Again, by connecting a direct current voltmeter across the primary, and using wires from an auto battery to make and break the circuit across the secondary, students will see how this action of the low battery voltage produces a high voltage in the primary, thus teaching the manner of use of a radio vibrator and the ignition system in the modern automobile.

The possibilities of this transformer are legion. It only remains for the teacher to arrange them so the demonstrations are dramatic — therefore long remembered.

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The Pentagon handles 280,000 phone calls a day on its 28,000 telephones. — *Wisconsin Military District.*

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The Pentagon's 5 floors have 150 stairways, 19 escalators and many elevators. — *Wisconsin Military District.*

## BOOK RACK

**EUGENE D. KAMPA**
Shop Instructor
Charlotte Wood School
Danville, Calif.

### BILL OF MATERIALS

| *No. of Pieces* | *Material* | *Size* |
|---|---|---|
| 2 | Mild steel strip stock | ⅛ x ½ x 20 in. |
| 2 | Mild steel strip stock | ⅛ x ½ x 3 in. |

### Tools

Rule, square, scriber, dividers, hack saw, file, vise, wire brush.

### Supplies

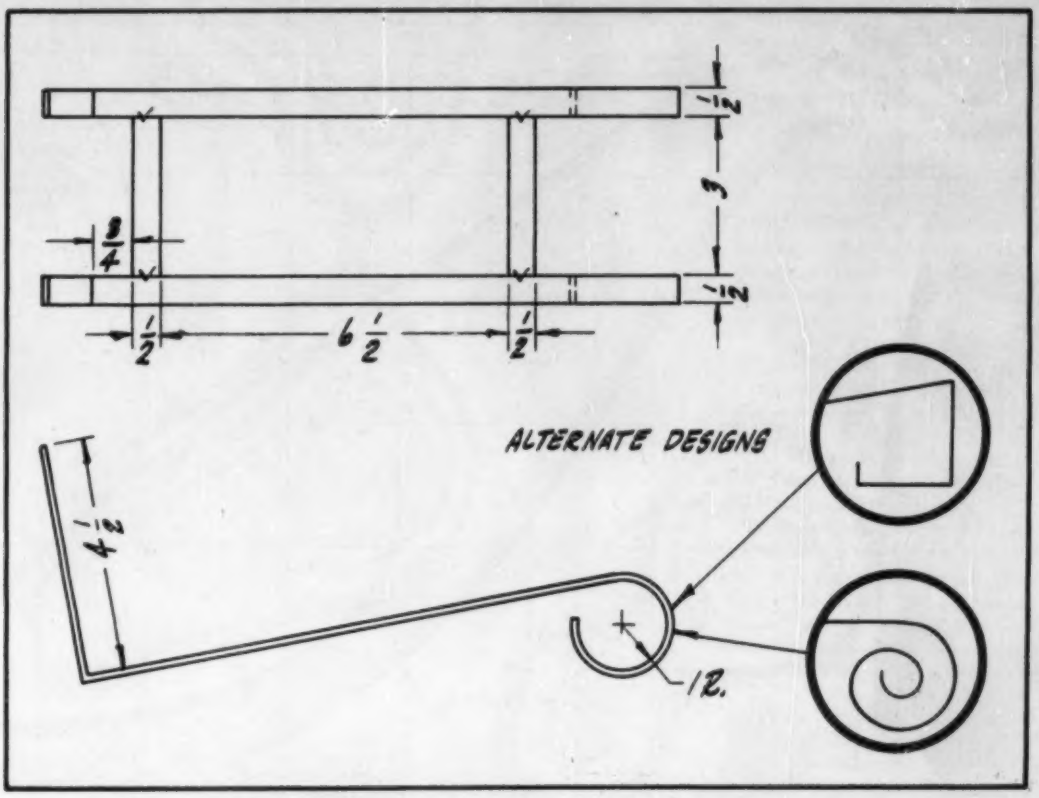
Abrasive cloth, flat black paint, brazing rod, flux.

### Equipment

Grinder, oxyacetylene welder, bending machine.

### Procedure

1. Select stock.
2. Lay out stock.
3. Cut out stock with hack saw.
4. Round both ends of long pieces.
5. Bend design on one end of each long piece.
6. Make 90-deg. bends on other ends of long pieces.
7. Bevel ends of short pieces in preparation for brazing.




Book rack by Eugene D. Kampa

8. Braze pieces together.
9. Clean up welds.
10. Remove scale with wire brush.
11. Emery cloth all edges.
12. Paint two coats with flat black paint.

## CALIFORNIA QUAIL

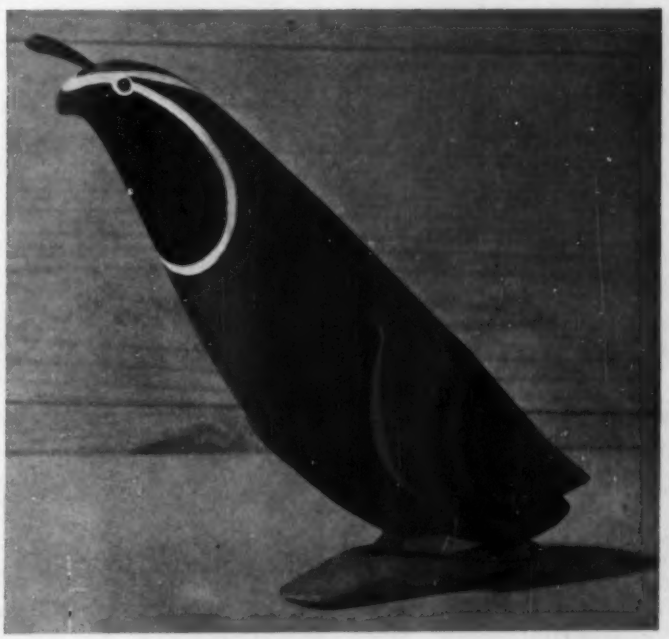
**BEN HUNT**

**Hales Corners, Wis.**

Although quite stylized, the color and markings of this whittling make it easily recognizable to anyone acquainted with the birds themselves. The whittling is about as simple as anything can be. Should you be unable to get 2½-in. pine, you can use 2-in. stuff and enlarge it with ⅞-in., or ¾-in. squares. Paint it before mounting on a base, and this is how I painted it.

First I gave it a sponging with water, to raise the grain. After it is dry, sandpaper until it is smooth again. You may wish to repeat this wetting and sanding, depending on the wood. The body color is a regular poster brown water color with a little white added to lighten it somewhat. More like a milk chocolate color. Pencil the head and throat markings.

Now dampen the entire bird again and while it is still damp apply the body color. Being damp, the brush marks have a tendency to blend nicely. The back from X up to about Y is shaded a little lighter, blending into the brown.



The completed project

The very top of the head is a brick or burnt orange color and that, too, is blended into the brown as indicated in the upper right hand corner of Figure 1.

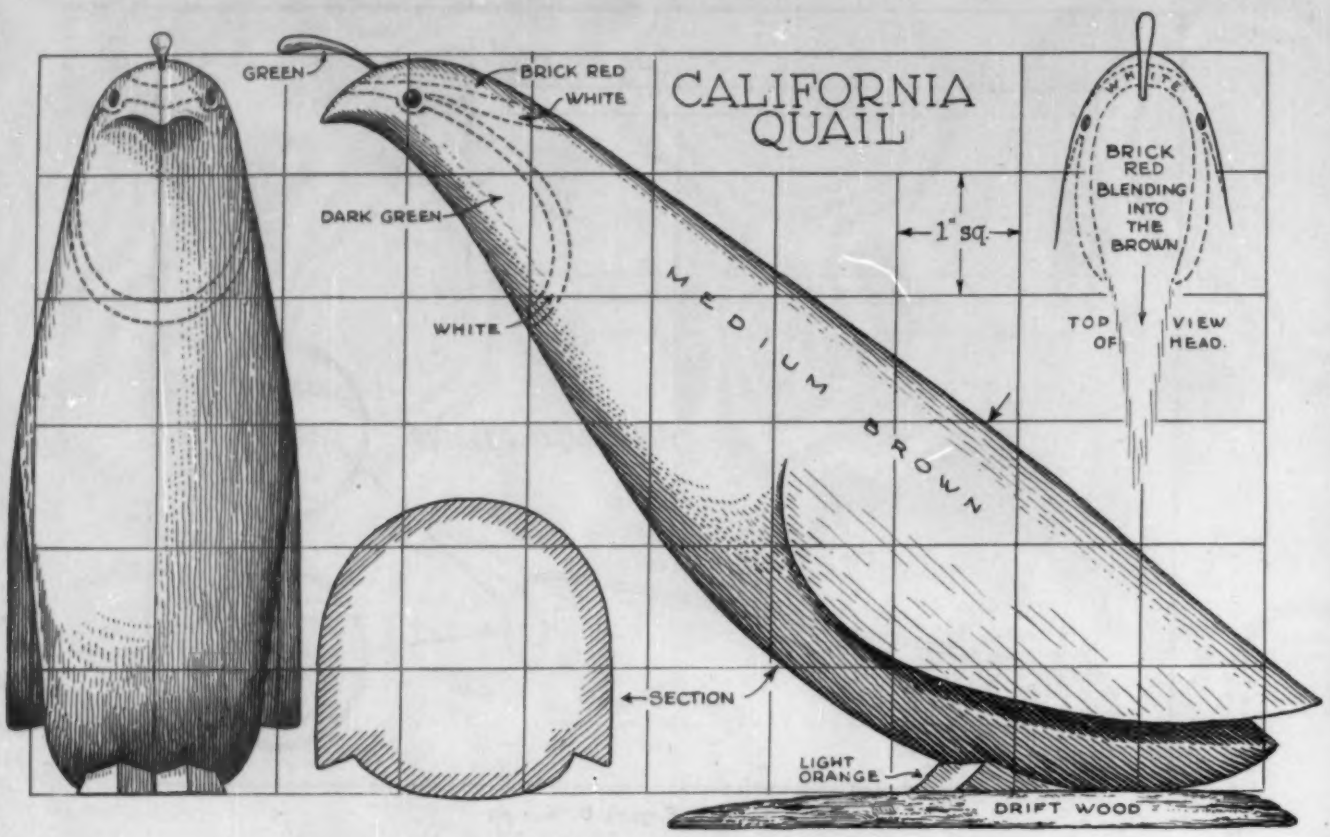



Fig. 1. Detail drawing of the California Quail

When those two areas are dry, paint the white markings and the green. The eyes are made by pressing down with a 1/8-in. hollow nail set and twirling it at the same time. Paint the eye black and when dry, put a drop of clear finger nail polish over to give it a glossy look.

Mount it on a thin slab of driftwood about ½ in. thick, and of course a light spray coat of lacquer or plastic bomb spray will prevent the water colors from smudging.

## MERRY CHRISTMAS CANDELABRA

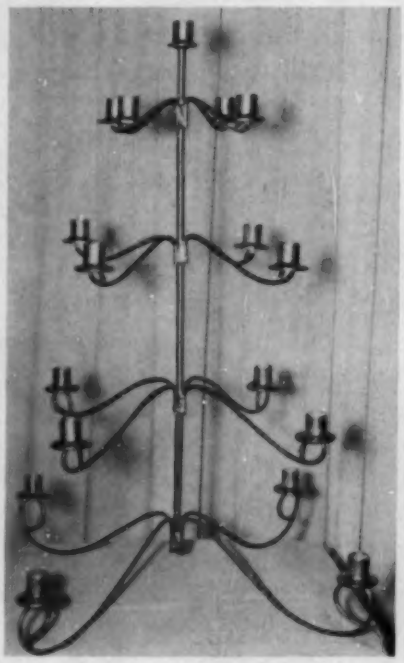
**TED ESELGROTH**

Glen Ellyn, Ill.

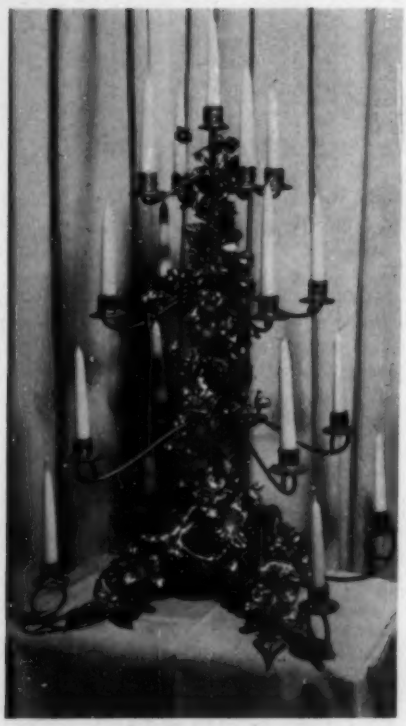
Welding rod, steel washers, electrical conduit and a little skill with an oxyacetylene blowpipe are all that are needed to build this 28 in. high Christmas "tree."

*Materials required:*

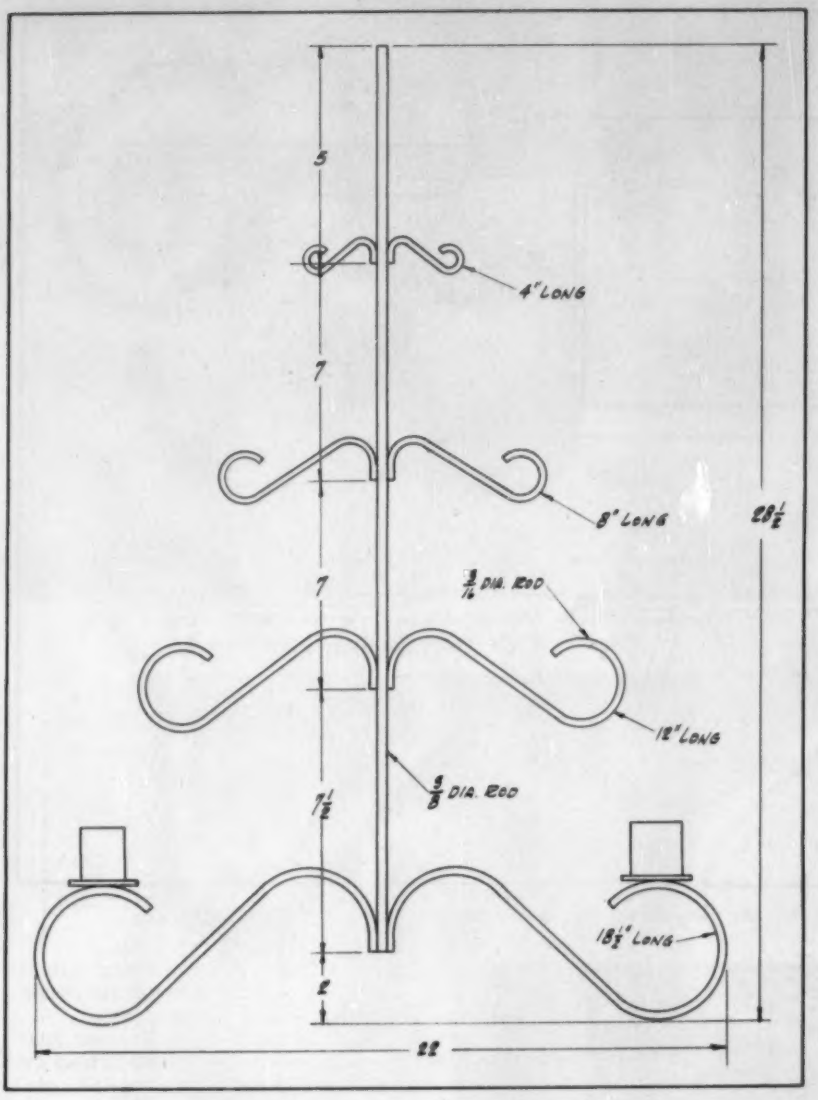
Trunk — ¾ in. welding rod 26 in. long
Branches — 4 pieces each 3/16 in. diameter welding rod
Top — 4 in.
Second — 8 in.
Third — 12 in.
Bottom — 18½ in.



Christmas candelabra



Candelabra in use




Detail drawing of the candelabra

Candleholders — 17 steel washers 1½ in. outside diameter and 14 in. of ¾ in. solid electrical conduit sawed into 17 pieces each ¾ in. long.

*Procedure:*

Clamp four rods of equal length in a vise and cold bend them into a scroll form to which you will later weld the candleholders. Make uniform bends of about 90 degrees where branches will be welded to trunk. Repeat this process with three other sets of branches. Use ⅛-in. flux-coated bronze rod to braze weld the limbs to the trunk on a 90 degree spacing.

The next step is to fusion weld the washers horizontally on the upper side of the scroll on each branch. Use a 1/16-in. steel rod for this welding. Final step is to braze weld the ¾-in. lengths of conduit to the washers. Braze welding is best for this because it is done at a low temperature and the previous fusion welds are not affected.

The picture shows that artificial flowers and leaves were wired to the frame and the entire assembly was spray (can) painted with gilt. With blazing candles you can use this tree as a feature in your living and dining room and it will brighten your Christmas for many years to come.

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Did you mar the floor while moving furniture? After the marred spot is cleaned and dry, apply a fresh, thin coat of pure, white shellac to the wood surface. — *Shellac Information Bureau.*

# A COFFEE TABLE WITH KEYS AND SPLINES

**FRED A. OLSEN**
Industrial Arts Department
Ohio State University
Columbus, Ohio

The selection of a suitable project in industrial arts requires a great deal of thought and analysis. Utility, interest, cost, design, and many other factors must be considered.

How well a project meets the objectives of industrial arts is of prime consideration. However, all too often a project is designed that is supposed to fulfill every conceivable industrial-arts objective. At times we fabricate objectives in our effort to enhance the value of a project. In either case we needlessly delude ourselves.

If a particular project does not meet all objectives during construction, perhaps the next will adequately complement the first. It is much better if the project can provide rich, satisfying experiences in a number of objective areas rather than meager, inadequate experiences in all areas.

This project, a coffee table, is intended primarily for 10th grade students. The cost is small, varying of course with the type of wood used.

Structurally the table is very light but is easily strong enough to support the weight of an average adult. This structural strength is accomplished through the use of splines in the top and braces and keys for the legs. The splines and keys have been incorporated into the design to emphasize the elements of construction. Woods of contrasting colors can be used to show off these elements.

Listed below are the power and hand tools used in the construction of this project.

### Power Tools

1. Band saw
2. Jointer
3. Planer
4. Table saw
5. Jig saw
6. Lathe
7. Power sander may be used

### Hand Tools

1. Crosscut saw
2. Framing square
3. Compass
4. Bench rule
5. Brace, auger and expansive bit
6. Mallet
7. Backsaw
8. Boring jig
9. Bar clamps
10. Hand screws
11. Lathe tools: gauge, round-nose scraper, parting tool, skew, calipers, and goggles
12. Try square
13. Wood file
14. Jointer plane
15. Jack plane
16. Block plane

While this project is teacher-designed, additional planning must be done by the student if he wishes to use different dimensions. A larger or smaller top may be de-

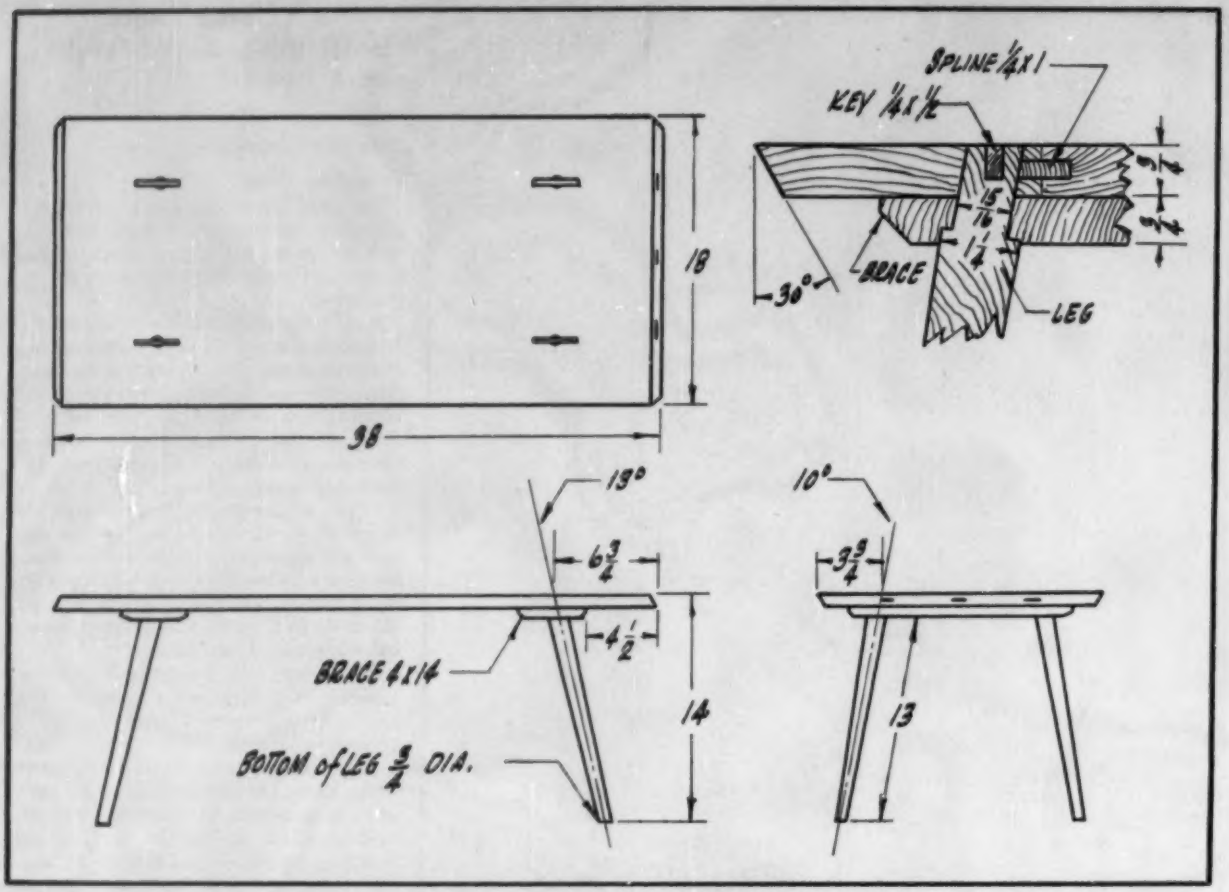



Fig. 4. Details of the coffee table

Fig. 1. A jig may be used when boring the holes for the legs. For best results this operation should be a co-operative one
— Photos by the author

sired as well as longer or shorter legs. If any change is made, proportionate changes should be made in the other parts.

Processes involved in this project range from relatively simple to complex hand and power tool operations. For example, complex setups must be made when the holes are drilled for the legs and also when the keyways are cut on the table saw. Each setup requires considerable student thought and accurate measuring and should be checked by the instructor before the student continues the operation.

Safety is of prime importance in the above-mentioned operations as well as with other hand and power tools. Each demonstration should emphasize safe use of tools.

This project is one which requires a great deal of co-operative effort. Many of the operations can best be done only when two students are working together.

The following steps of procedure are, of necessity, general in nature, and should be explained and demonstrated more fully during actual construction of the table.

### Steps of Procedure

1. Record all material on bill of material card.

Fig. 3. On a light colored table top the keys should be made of a dark wood to set off the structural elements

Fig. 2. The keyways may be cut easily on the table saw. However, this set-up should be checked by the instructor before the student proceeds

2. Figure board feet and cost of project.
3. Select boards for the top.
4. Measure and mark boards to desired width.
5. Saw boards to width on the band saw.
6. Joint one face flat and true with the jack or jointer plane.
7. Surface second face to size.
8. Lay out boards and mark preparatory to jointing edges.
9. Joint edges for gluing. Check for light or a poor joint.
10. Attach dado head to table saw and cut grooves in boards for splines.
11. Rip splines of contrasting wood. Test fit boards together with splines in place.
12. Glue boards edge to edge and fasten with bar clamps. Test top for levelness.
13. After glue has dried, remove excess glue with a scraper.
14. Plane bottom and top of table flat and smooth with jointer or jack plane.
15. Adjust table saw, rip and crosscut ends and edges of table top to 60 deg.
16. Square stock for braces to size with hand tools or table saw.
17. Mark braces for chamfers.
18. Cut chamfers with jack plane or table saw.
19. Lay out position for braces on bottom of table top.
20. Glue in place and fasten with hand screws.
21. Lay out location for jig and hold in place with hand screws.

NOTE: For a jig, holes of correct size and angle may be drilled through a 4 in. thick piece of hardwood. The jig is then clamped in such a position on the table top that the holes for the legs may be bored accurately. Instructions for using the jig may be typed on a card and glued to the side of the jig. This card is visible in *Figure 1*.

22. Bore the holes with a brace and bit from the upper surface of coffee table until tip of feed screw just emerges through the other side.
23. Turn table top over, adjust expansive bit to desired size and bore out remainder of holes.
24. Select stock for legs, cut and mark for lathe centers.
25. Fasten stock between centers and cut to rough size with gouge.
26. Cut to correct size at ends and middle with parting tool. Use calipers to check size.
27. Cut to finish size with a skew or round-nose scraper. Sand smooth.
28. Fit legs into holes in table top.
29. Saw slot for wedge in top of leg. Cut wedge.
30. With legs in position, glue and drive wedges into place. This insures a tight fit for the legs.
31. Plane, file, and sand top of leg flush with top of the table.
32. Fasten dado head to table saw, adjust depth of the blade, position fence and hand screw and cut keyways. See *Figure 2*.
33. Scribe arc of keys with a compass.
34. Cut and glue keys in place. See *Figure 3*.
35. Cut legs to length so that the table sets level.
36. Sand entire project smooth.
37. Apply desired finish.

## TELEVISION SERVICING JOB SHEETS

**WILLIAM JEROLD**
**Mineola High School**
**Industrial Education Department**
**Mineola, N. Y.**

The effectiveness of any curriculum in a vocational program is directly related to

the planning and preparation of the job sheets. Various types of tools and equipment are required to do a job but none of them are as important as the instruction sheet that is used by the students in performing their shop work.

They are responsible for the motivation, interest, and for providing the best learning situation. In order to do this they must be simple to understand and progress from the simple to the complex in a meaningful order; meaningful to the student, which means jobs that the students understand and still provide new opportunities for learning.

In electronics the student is confronted with many intangible factors such as resistence, voltage, and current and it is for this reason that you cannot place enough emphasis upon the job sheets. This is the blueprint that the student follows.

The job sheet should be developed in a logical sequence of questions and answers. Questions that you would ask a beginner if you were confronted with the job of repairing a TV receiver.

What is the complaint?

What should I do first?

How am I supposed to do it, and many more questions.

The answers are obviously procured by doing the job.

In preparing this job sheet it has been the attempt to create many answers and questions in this order.

To meet this requirement, the job sheet was outlined into various areas as follows:

| | |
|---|---|
| 1. Symptoms | 5. Equipment |
| 2. Reference | 6. Procedure |
| 3. Introduction | 7. Conclusions |
| 4. Object | 8. Questions |

To understand the purpose of these areas it will require an explanation for each one of these:

*Symptoms*

This exposes the student to the problem creating a need for the job. The student has a definite objective and therefore has a better understanding of what is expected of him.

*Reference*

When we are given a job it would seem logical that we should know where to look for information that would help us to do the work. The student is encouraged to make use of his service manual and how to interpret the technical information.

*Introduction*

First the student is given general background information that will help him to understand the problem and the job that is to be done.

*Object*

The question of what are we going to do to correct this problem is answered here. A definite clarification of what the aim of the job is is made here.

*Procedure*

The question of how the job is done is answered at this time. Whether we are adult or adolescent we do not relish the idea of reading lengthy explanations. On the basis of this assumption, a chart has been prepared, one that presents all the necessary instructions — brief but explicit. When a student is confronted with a long, drawn-out procedure, he generally browses through looking for the important high lights — those that he thinks are necessary to do the job, disregarding the rest. This will result in many instances in erroneous conclusions that lead to incompetence.

Since the instruction is in a condensed form on the chart, the student is required to place a photograph that represents that particular symptom. He can cut out the photo from his service manual or any trade magazine and paste them on the job sheet. In many of these wave shapes, it is very difficult for the student to draw what he sees on the picture tube with any accuracy. By placing a photograph on his job sheet he has before him a picture of the actual conditions of the symptom.

This procedure is followed throughout all the laboratory work wherever possible and you can appreciate the problems that the student will encounter in drawing when he is making advanced waveform analysis.

*Conclusion*

The student's attitude after completing the job may be one like this: It was very interesting, but what am I supposed to have learned from this experience?

This is the purpose of the conclusions — to bring out the important aspects of the job and directly places the responsibility on the student for the information and laboratory procedures that are associated with this job.

It is a well-known fact that students like to know what is expected of them and the conclusion outlines this in detail.

*Questions*

The questions present an opportunity to the student to review the information and instructions that are related to the job. These questions should be so selected that the student will be required to refer to his results on the job sheet for the information that is needed to answer the questions. The Job Sheet, together with the chart for TV control adjustment is illustrated here. This is one complete job. The more advanced control adjustments are introduced by another job sheet.

MINEOLA HIGH SCHOOL
TELEVISION LAB ONE A
ELECTRONICS TWO

Name.....Date.....

*SYMPTOMS* TV Front Controls

Picture or Test Pattern will have one or more of the following defects.

A. Vertical retrace lines visible.

B. Poor picture background information.

C. Intermittent vertical or horizontal sync.

*REFERENCE*

A. R.C.A. 630 service manual, pages 3, 12, 27, and 28.

B. *Television Servicing* by Heller & Shulman. Chapter four.

*INTRODUCTION*

The controls that are included in this job are usually found in the front of the standard commercial receiver. They do require frequent resetting and therefore are placed in an accessible position to the operator.

*OBJECT*

A. How to adjust the various television controls under the following conditions:

1. When you are receiving a picture.
2. When you are receiving a test pattern.

B. To develop a sequence of adjustment for these controls.

*PROCEDURE*

1. Turn receiver on and allow about one minute for warmup.
2. Turn selector (channel) to desired station. Test pattern preferable.
3. Set all other front controls to mid-position.
4. Follow instructions on chart.

*CONCLUSION* One A TV Front Controls

1. You will experience that the picture and brightness controls have similar effects upon either the picture or test pattern. That is, they both vary the white and the black picture points. The correct adjustment for these controls is to obtain a gray background information.
2. Under the title illustrated on the chart place a photo of a test pattern that illustrates a condition that is caused by that particular control being misadjusted.
3. You are required to know the correct adjustment of these controls under the conditions:
   A. Picture
   B. Test pattern

*QUESTIONS*

1. Name the section of the TV receiver that each control is associated with.
2. Name the controls, and under what condition can it cause the following?
   A. Vertical retrace lines.

B. Distorted sound.
C. Intermittent sync.

MINEOLA HIGH SCHOOL
TELEVISION LAB ONE B
ELECTRONICS TWO

Name.....Date.....

*SYMPTOM*

1. Poor horizontal or vertical linearity.
2. Picture not centered vertically or horizontally.
3. Insufficient width.
4. Poor focusing.

*REFERENCE*
*INTRODUCTION*

The symptoms mentioned above can be caused by one or more controls that are misadjusted. You will find that each control adjustment affects a particular portion of the test pattern or picture and through the repetition of these adjustments you will be able to select the correct control to eliminate the undesired distortion.

The adjustment of these controls that are generally found in the rear of the receiver requires the service of a trained technician. You should realize the importance of developing skill in these adjustments as they represent a final tune up of the receiver and the over-all performance after a repair will depend upon your ability to handle the job.

*OBJECT*

1. To learn the correct terminology that describes the various types of test pattern or picture distortion.

*OBJECT* TV Controls One B

2. The relationship between a particular control and its effect upon the test pattern or picture.
3. To develop a procedure in adjusting those controls that will result in speed and accuracy.

*PROCEDURE*

1. Turn receiver on and allow it to warm up for about two minutes. This will allow the tubes to reach a stabilized point of operation.
2. Tune receiver to test pattern if available, otherwise use a picture.
3. Make all adjustments as indicated on chart. One step at a time.
4. Under the title ILLUSTRATE on the chart, place a photo of a test pattern that illustrates the condition caused by that particular control being misadjusted.

*CONCLUSION*

1. You are required to know what effect each control has upon the various parts of the test pattern.
2. This procedure must be applied to the R.C.A. and the Admiral receivers.

*QUESTIONS*

1. When using a picture what do you use as a guide to determine
   A. Height
   B. Width

*QUESTIONS* ONE B. TV Controls

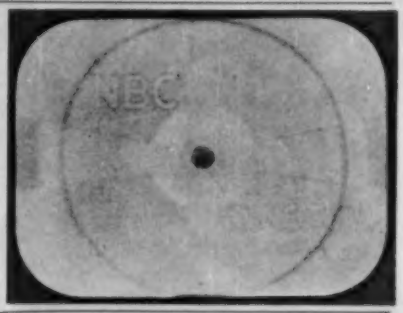
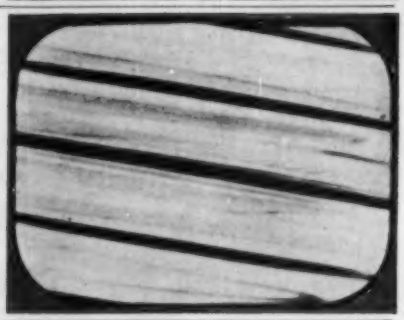
2. Can you obtain good focusing by using a picture? *Explain.*
3. Name the section of the TV receiver that each control is associated with.
4. What is meant by the best picture resolution?

# TELEVISION CONTROLS A

**TV MAKE** R.C.A. **MODEL** 630 **DATE** April 10, 1956

**SYMPTOMS** Picture, Test pattern distortion **SECTION** Front TV controls **NAME** Wall Noel

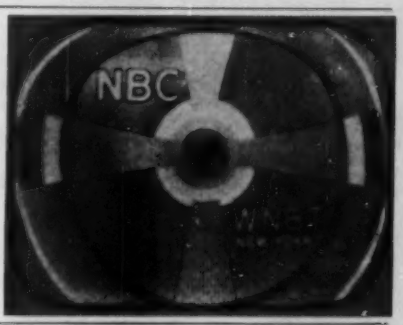
| | *Picture* | *Test Pattern* | *Illustration* |
|---|---|---|---|
| ***Name of Control*** | ***Correct Adjustment*** | ***Correct Adjustment*** | ***Photograph*** |
| **1. All controls set in the normal position**<br><br>**Normal picture and test pattern** | **Notice black and white with gray background** | **Notice wedges and shaded circles** | |

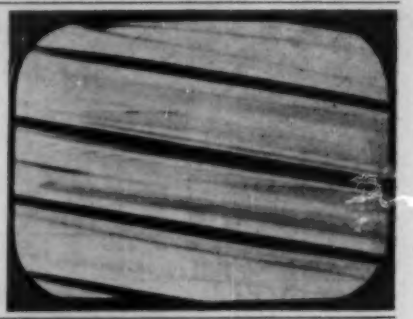
| | *Picture* | *Test Pattern* | *Illustration* |
|---|---|---|---|
| *Name of Control* | *Correct Adjustment* | *Correct Adjustment* | *Photograph* |
| 2. Brightness | Turn picture control down.<br><br>Decrease brightness control to loose raster. | Observe difference in shade of inner cycles |  |
| 3. Picture control | Adjust for gray background of picture information | Adjust for correct ratio of black and white circles in center of pattern | |
| 4. Vertical hold control | Locks picture vertically<br><br>If not properly adjusted it will produce intermittent synchronization | Locks test pattern vertically | |
| 5. Horizontal hold control | Locks picture horizontally<br><br>Should remain in sync while control is varied slightly | Locks test pattern horizontally |  |
| 6. Fine tuning | Adjust for maximum sound<br><br>At this point you should get the best picture resolution | Adjust for maximum 400 cycle audio | |

# TELEVISION CONTROLS B

**TV MAKE** R.C.A. **MODEL** 630 **DATE** April 3, 1956

**SYMPTOMS** Picture, test pattern distortion **SECTION** Rear TV controls **NAME** Wall Noel

| | *Picture* | *Test Pattern* | *Illustration* |
|---|---|---|---|
| ***Name of Control*** | ***Correct Adjustment*** | ***Correct Adjustment*** | ***Photograph*** |
| 1. Vertical linearity | Picture to have equal vertical proportion | Equal amplitude of vertical wedges |   |
| 2. Vertical height | Picture to occupy the mask vertically | Outside cycle should not be oval<br>Vertical wedges should be equal to horizontal ones | |
| 3. Horizontal width | Picture to occupy the width of the mask | Left and right side of test pattern to fill mask | |
| 4. Vertical and horizontal centering | Picture to occupy the mask vertically and horizontally | Outside cycle to be symmetrical<br>All sides of test pattern to occupy mask | |

| | *Picture* | *Test Pattern* | *Illustration* |
|---|---|---|---|
| *Name of Control* | *Correct Adjustment* | *Correct Adjustment* | *Photograph* |
| 5. Sync lock | With horizontal hold in mid-position adjust to lock picture horizontally | With horizontal hold in mid-position adjust to lock test pattern horizontally |  |
| 6. Focus control | RASTER<br>Adjust to see horizontal lines<br>PICTURE<br>Best picture resolution | Sharpness of wedges toward center of test pattern | |
| 7. Horizontal drive | Adjust to fill in mask horizontally<br>Effects right side of picture | Adjust to fill in mask horizontally<br>Effects right side of test pattern<br>Use with width control | |

## ESKIMO MASK

**BEN HUNT**
Hales Corners, Wis.

Try to picture an Eskimo, bundled in furs, sitting in his igloo, laboriously carving a mask like one of those shown here. You wonder if his mind is as warped as the mask. But evidently it isn't, because these are just three of many of these symmetrical carvings. The two sketched in Figure 1-A and Figure 1-B are from the 1896–97 American report of the Bureau of Ethnology and the one shown in detail is in the collection of the University Museum of Philadelphia. These masks depict some spirit or tunghak, they tell us. They are all interesting and different. I've been wanting to make this particular one for a long time, and then surprised myself by doing the actual carving in less than four hours, using a small crooked knife and my regular pocketknife.

Eskimos, by the way, use a crooked knife, Figure 1-C, but differing from the Indian crooked knife. It is somewhat on the principle of a spokeshave and is used for carving ivory, bone, and wood. Eskimos get steel for these knives from old saws, obtained from sailors. Handsaw steel can be filed and is easy to bend without heat, and no tempering or hardening is necessary.

As with other masks, pine is easiest to obtain and whittle. By mistake I grabbed a piece of sugar pine. Note the *sugar* spots on the photograph in Figure 4. Since this was to be painted, it didn't matter much, but it clearly shows what would happen to a nice whittling that was to be left natural. These spots tend to darken in time. So get white pine whenever you can. Eskimos use wood that drifts in and for the most part it is poplar, which is also easy to carve or whittle, as the case may be.

After drawing the outlines on a 2-in. piece, saw around the outer line and fasten a 1 by 1-in. piece of wood to the back with two screws. Clamp it in a vise, Figure 2, and with a drawknife or spokeshave, round it off roughly to the desired contour. This saves a lot of time. Now you will have to redraw some of the outlines that were cut away. You may wish to bore lead holes for the eye and nostril at this time, but I find it easier to whittle right across those spots and put the openings in later on. That's a matter of choice.

The nose is, of course, the highest spot. The hollow for the eye is gouged out as shown in the side sectional view. Note that this hollow tends to slope from B to A, Figure 3. The back is hollowed out so as to form a thinner edge around the two openings. The teeth are of 3/16-in. birch dowel rod. Holes for teeth and feathers are drilled last. I don't know why that stick projects from the head but it was meant for a purpose so there it is. It is of 1/8 by 5/8-in. wood, projecting about 5 in. After sanding it paint it white, with the eye hollow, brown with white dots and the mouth black. Put the teeth in when black paint is dry. Then add the six feathers. They can be any white feathers, goose, chicken, or what have you (Figure 5).

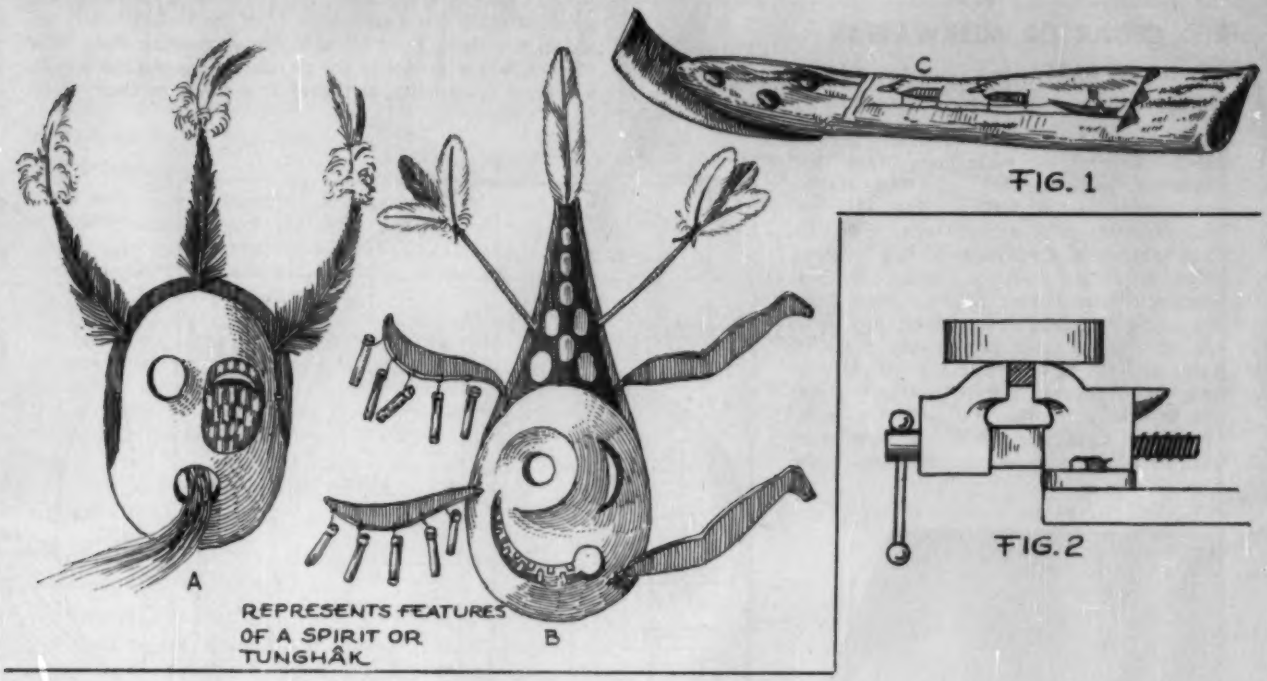



FIG. 1

FIG. 2

Fig. 5. Eskimo mask

## RED CEDAR OR MISKWÁWAK

ORVILLE A. OAKS

Wilmette, Ill.

Our American Indians are gradually adopting the ways of the white man. Many still remember, however, their ancestors of the now distant past and their myths and beliefs concerning the sacred cedar tree. To those ancestors, consisting of the various tribes of Plains Indians (Teton, Dakota, Pawnee, Omaha-Ponca, Kiowa, Osage, Shoshoni, and Winnebago), as well as the Cherokee of Georgia and neighboring southern states, and the Chippewa of Canada, Minnesota, and Wisconsin, our red cedar was one tree especially revered. To them the cedar (Juniperus Virginiana), a widely distributed member of the pine family, symbolized the *Tree of Life*.

Fig. 4

Red Cedar or Miskwáwak, the *Redwood* of the Chippewa, acquired much of its sacredness from the Indians' daily association with it. They found it always growing along their streams, where gradually the popular minds clothed it with a sort of personality and gave it a place in their philo-

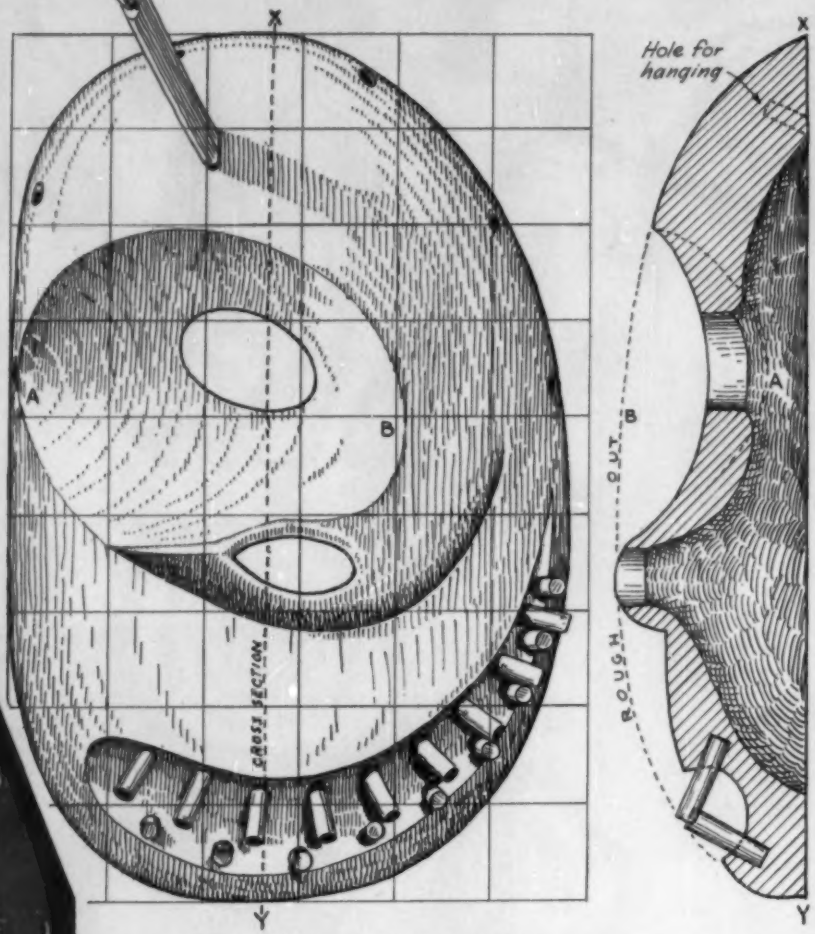



Fig. 3. Section of Eskimo mask

sophical thoughts and religious rituals. The appearance, too, of the Miskwáwak impressed their imagination. By its habit of growing in lonely places, "standing dark and silent, like an Indian with his robe drawn over his head in meditation and prayer," it "seemed to be in communion with the Higher Powers." Because of its everlasting green, balsamic fragrance, the beautiful dark red color of its heart, as though dyed in blood, its fine grain, nonwarping and practically eternal lasting quality of the wood, the Cherokee and Shoshoni gave the red cedar a mystic sacredness above all other trees. The Omaha creation myth also related the red cedar to the appearance of the human race on earth.

### Wicked Magician Gives Cedar Its Red Color

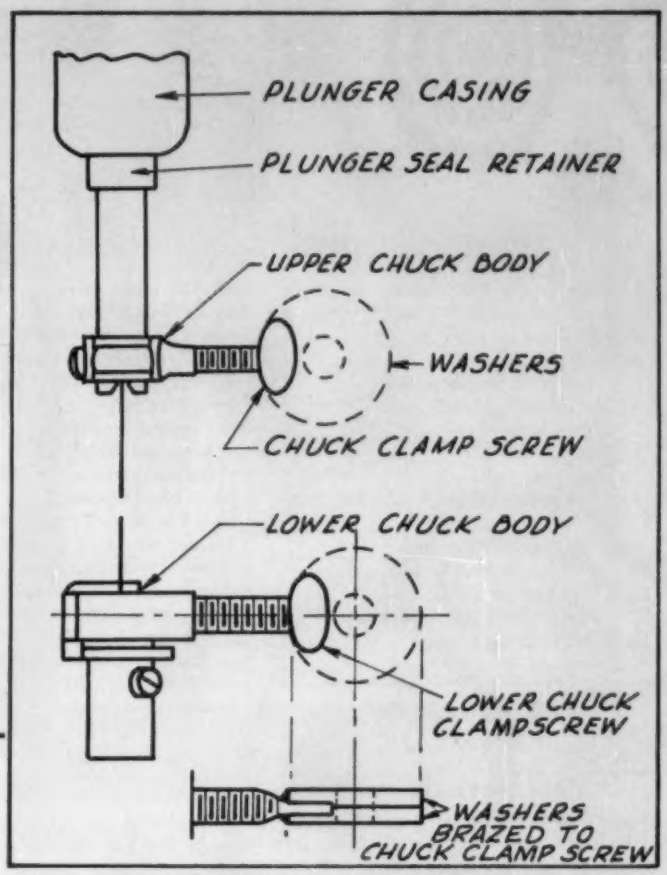
The cedar became a *medicine* tree to the Cherokee and their neighbors, the Yuchi, because of a wicked magician. He had been disturbing the daily course of the sun until finally he was killed by two brave warriors. His head, displayed before the tribe, still remained alive. It was then hung on various trees but still refused to

(Continued on page 58)

## IMPROVED THUMBSCREW CHUCK ASSEMBLY

KEITH H. JENNER
Industrial Arts Department
Fort Dodge Senior High School
Fort Dodge, Iowa

To improve the method of securing scroll-saw blades and other attachments in the chucks of the scroll saw, and thus prevent the need for using small hand tools for tightening the small thumbscrews, two ⅜-in. washers can be brazed to the thumbscrews. The washers are first swedged to fit the contour of the small flat portion of the existing thumbscrews. When the two washers are then brazed to each thumbscrew sufficient leverage can be obtained with thumb and fingers to hold all attachments in the chucks of the machine. All changes on this part of the machine can then be easily and quickly made.

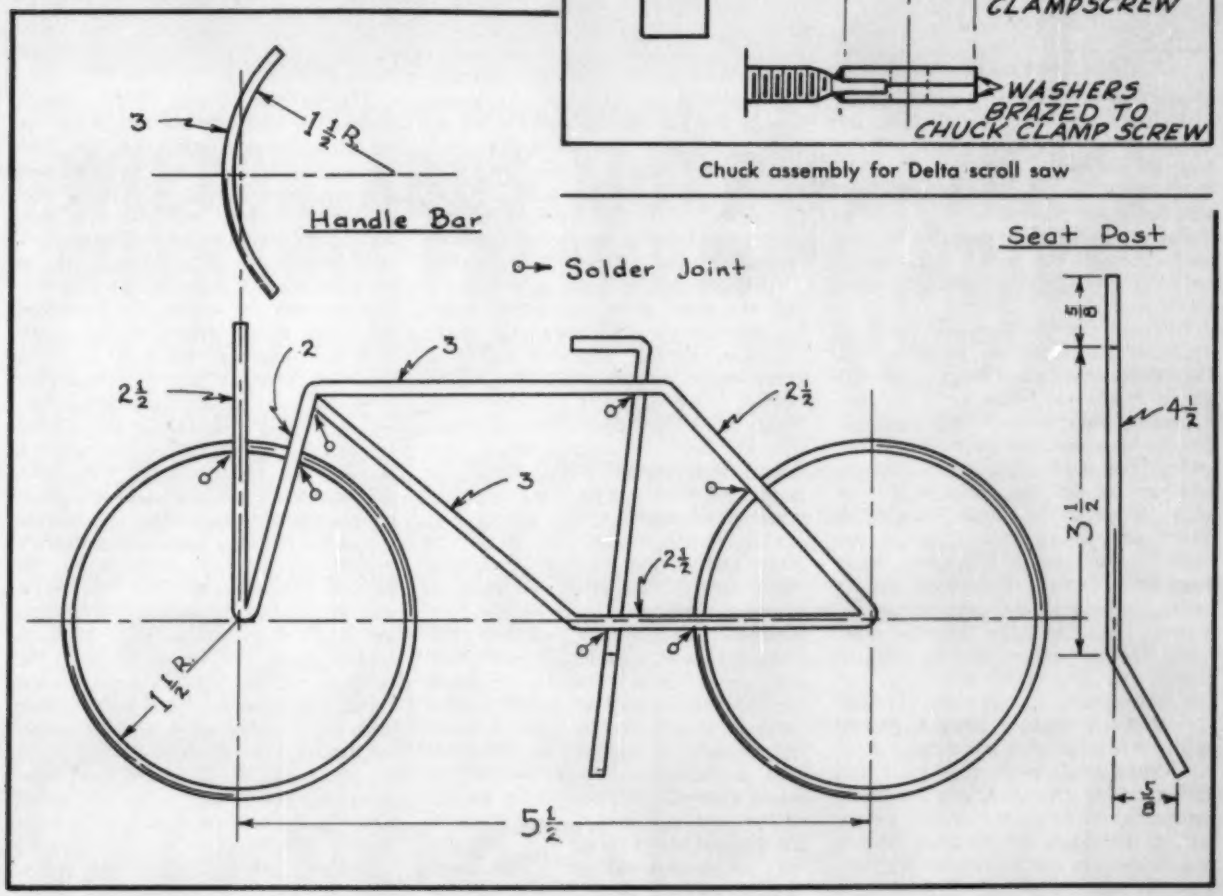



Chuck assembly for Delta scroll saw

## MINIATURE BIKE

GEORGE F. LARTZ
Industrial Arts Instructor
Sheboygan Public Schools
Sheboygan, Wis.

A good beginning junior high school general metals project is this miniature bike. Made of coat hanger wire the job offers good instruction, and practice, in simple




Detail drawing of the miniature bike by George F. Lartz

forming, fitting, and soldering. Also included is the basic practice of following a pattern, or template, as preferred. When finished in flat black this bike is a nice addition to the trinket collection of any boy.

*Materials Needed:*

Two coat hangers, solder, flux

*Lengths Needed:*

Frame — 15¾ in. Wheels — 9½ in. each
Seat Post — 4½ in. Handle Bar — 3 in.

*Plan of Construction:*

1. Make a full-size drawing on cardboard, or masonite, for a pattern template.
2. Straighten hangers.
3. Cut wire to length needed.
4. Form frame.
5. Form wheels.
6. Form handle bars.
7. Form seat post.
8. Clean points at which soldering is to be accomplished.
9. Solder wheels to frame.
10. Solder handle bars to frame.
11. Solder seat post to frame.
12. Clean soldered joints of flux.
13. Paint with flat black.

## RED CEDAR OR MISKWÁWAK

(Continued from page 56)

die until at last hung on a cedar, where, in dying, its blood trickled down the trunk and gave the wood its red color as you see it today. Another Cherokee myth relates to the cedar as a trimmed and decorated popling or pole, used as a place to hang the fresh scalps of their enemies, with the wood attaining its red color from the blood slowly trickling to the ground.

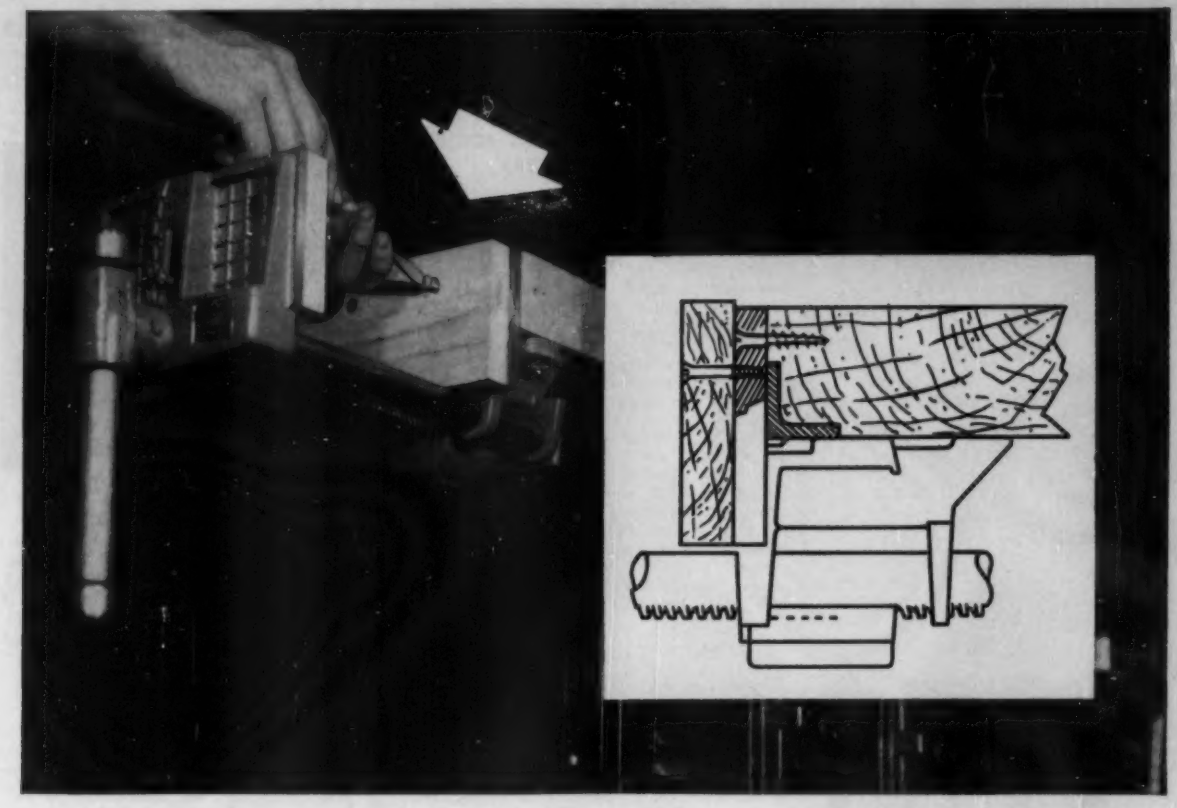
Although the Cherokee held the wood of cedar too sacred to burn as fuel, they threw small green twigs on the fire as an incense to drive away the evil ghosts of their dreams since they believed the malevolent ghosts could not endure the smell. The Teton Dakota, however, believed the smoke from cedar wood or even the smell from cedar would scare away such ghosts. Cedar mats of the Ontario Chippewa, made from strips of outer bark, were given a mahogany color by dipping them in dye secured from the boiled dark-red inner bark. This, of course, was the work of the squaw. Miskwáwak also furnished the Meskwaki, Chippewa, Omaha, Pawnee, and Dakota with a general utility medicine. This was usually made by boiling small twigs and fruits, and either taking the decoction internally or sprinkling it on hot stoves for inhaling, depending on the tribe. Horses, too, were given this for coughs. Purification rites of the Omaha-Dakota were performed by sprinkling cedar twigs on hot stoves in their vapor bath. The twigs were used, too, by many tribes, as an incense and perfume during their ancient sun-dance performances, and yet today in their Peyote religious ceremonies. This is a sacramental ceremony consisting of eating the Mescal Button, the fruit of a special cactus, which contains a powerful but apparently harmless narcotic.

The cedar was especially sacred to the Omaha, as they considered it linked with the destructive agencies of thunder, lightning, and war. The mythical thunderbirds, who made their nests in the tall cedars of the West Coast — probably western red cedar, a different type of cedar — used a red cedar of the Omaha as their favorite tree for perching on during their flights across the heavens. In fact, it was the thunderbirds who designated the very tree from which the sacred cedar pole was made. This was a sacred pole which stood as a cosmic symbol representative of supernatural power and authority, and stood as a central object for all to see at tribal gatherings. Thus, since the cedar was sacred to the thunderbird, cedar boughs were placed atop the tipi poles to ward off lightning. The Pawnee, too, considered the cedar immune to lightning and threw sprigs of it upon the fire during storms, as an incense offering, to turn aside the stroke. Although the mythical thunderbirds no longer live in the tall cedars, and the sacred cedar pole and the sun-dance ceremonies are things of the past, the Miskwáwak of "red wood" of the Chippewa still retains some of its past sacredness in the Peyote sacramental prayers of many Plains Indians today.

Although Miskwáwak or *red wood* was the name given our sacred cedar by the ancient Chippewa, the early Canadian French explorers called it *baton rouge* or red stick, due to the reddish color of the bark and wood. Thus, when they discovered the same tree in their Louisiana country they named their capitol Baton Rouge, in honor of it. The tree itself grows widely scattered throughout the eastern half of the United States from Maine to North Dakota and southward to eastern Texas and Florida. It is also found in southern Canada in Nova Scotia, New Brunswick, and Ontario. Few trees grow under such a wide variety of conditions, since the red cedar will find a precarious foothold and grows on nearly barren rock, or it will live in dense swamps, but appears at its best on the good soils of Tennessee. It will, however, be found seemingly at home on the poorest of the poor soils, truly a tree to excite the Indians of old by its fight for existence under any and all circumstances. During colonial days it was not uncommon to find red cedar growing to 100 to 120 feet tall and 3 to 4 feet in diameter throughout Virginia, Tennessee, Kentucky, and Alabama. The trunks of such large trees were often deeply grooved or fluted, suggesting extreme hardship during their life span of 300 or more years. This vagabond of trees is also often merely a shrub, familiar on abandoned farms and along fence rows throughout its range. As an ornamental it is one of America's best known evergreens, being one of the first to be cultivated. It now has many horticultural varieties planted throughout the temperate climes of the world. And today, one can still see and enjoy these stately Miskwáwak lining the driveways leading to many of Virginia's colonial mansions. At one time the cedar was a favorite windbreak tree around farm homes and orchards. Unfortunately, however, it was found to be a host tree for the "cedar apple," a rust fungus very damaging to apple trees, thus it is little planted for windbreaks now. The fruit, a small blue-black berry, is enjoyed so much by the cedar waxwing that it received its name because of it. At one time a "juniper beer" was made from the fruit, which also was and is still to some extent used for medicinal purposes. Cedar-leaf oil is now made commercially from the needles or leaves for this same use.

The medium weight, richly colored, pinkish to deep red wood, with the so refreshing aromatic odor, also furnishes a cedar-wood oil for perfumes and medicine. Due to its extreme durability and easily workable qualities, with little warpage or shrinkage, this cedar wood has been increasingly sought for since colonial times both for domestic use and for export. It furnished the miles of rail fences of the South from Revolutionary times up to 1900, some of which I saw still intact in 1946 and 1951 in the Shenandoah Valley of Virginia. Also the wood is used for small boats, scientific instruments, house posts, interior house trim, split shingles, telegraph poles, clothes closet linings, cigar boxes, coffins, and faucets for cider barrels. Due to the wood's perfect whittling properties it has no peer as pencil stock. Until recently it was in demand, because of durability, for small cooperage articles, such as tubs, churns, and water buckets, the latter of which I used as a boy on our Indiana farm before metal buckets were common. So, too, do I well remember helping dig the holes — much against my will — for the large end-gate fence posts of red cedar, 8 to 10 inches square, as well as for hundreds of smaller line-fence posts, all of which are nearly impossible to buy today. Some of the Plains Indians also recog-

(Continued on page 26A)



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# News Notes

## APPRENTICE CONTESTS FOR CASTING INDUSTRY

Since 1924, the American Foundrymen's Society has sponsored apprentice contests to stimulate the development of individual skills and craftsmanship in patternmaking and the foundry trades. The contests have been a distinct help in fostering increased interest in apprentice training and other aspects of in-plant training in the Metal Castings Industry.

Three types of local elimination contests are conducted across the country: AFS Chapter contests, single plant competitions, and interplant competitions in which three or more plants participate. Winners in the local elimination contests then advance to national competition.

The American Foundrymen's Society, under the direction of its Education Division, assumes responsibility for the administration of the contest and supplies the necessary materials for local elimination contests and the national judging.

*American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.*

## SCIENCE CLUBS OF AMERICA

More than 20,000 science club sponsors, most of them teachers, are being mailed a unique package of practical assistance in encouraging young student-scientists.

"Sponsor Handbook" is a compact manual, tightly packed with pertinent information, which is revised annually. It is supplied free by Science Clubs of America to the sponsors of its thousands of affiliated clubs all over the world.

The current edition is considerably enlarged and introduces several features designed to meet new needs and questions. The handbook sums up the latest guides to identifying an embryo scientist, pointing out that this is often possible while he or she is still in elementary school. Detailed information is supplied on how to enter students in the national competition in the Science Talent Search for the Westinghouse Science Scholarships and Awards, now in its eighteenth year.

A brief description of some of the science aids produced by Science Service, the nonprofit organization that administers Science Clubs of America, completes the book. It may be ordered from *Science Clubs of America, 1719 N St. N.W., Washington 6, D. C.*

## NATIONAL SAFETY COUNCIL PUBLICATIONS

The National Safety Council have introduced two new booklets — one aimed at safety in work situations, and the other on off-the-job traffic accidents.

"Are You Safety Minded?" is a multicolored pamphlet showing that most accidents are caused by people — not unsafe work conditions.

"The Professional Touch," a 12-page, multicolored pamphlet, points out tips on how to drive professionally, and shows where the amateur driver goes wrong.

*National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

## AWARDS GRANTED IN KODAK CONTEST

Sixteen teen-agers who earned $300 prizes top the list of winners in the 1958 Kodak High School Photo Contest.


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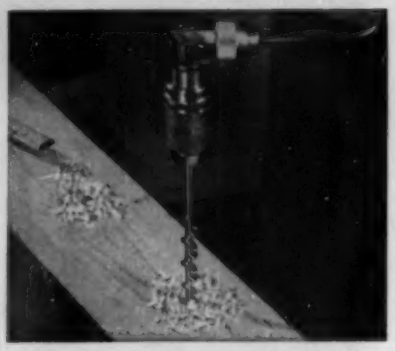

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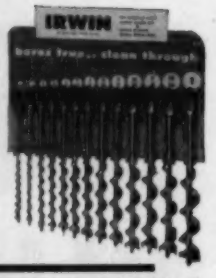


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Sponsored by Eastman Kodak Company and approved by the Contests and Activities Committee of the National Association of Secondary School Principals, the 13th annual contest resulted in cash awards totaling $10,400 and hundreds of State Certificates of Merit.

Grand Award winners of $300 are the following: Each represents the winning entry in freshman, sophomore, junior, or senior year high school in that order.

Class 1, School Activities — Thomas Nash of Greenwich, Conn., and Phillips Exeter Academy, Exeter, N. H.; Goetz Wolff, Los Angeles, Eagle Rock High School; Bill Barley, Charlotte, N. C., Central High School; and Ronnie Costa, Mount Vernon, N. Y., A. B. Davis High School.

Class 2, People, All Ages — Larry Lasky, Maplewood, N. J., South Orange Junior High School; George Nakano, Honolulu, Hawaii, McKinley High School; Charles E. Coffee, Minot, N. Dak., Minot Senior High School; and Jerry R. Berry, Ocala, Fla., Ocala High School.

Class 3, Pictorials — Dwight Egbert, Dodge City, Kans., Dodge City High School; Lee Lipner, Chicago, Lane Technical High School; Gary Burgess, Long Beach, Calif., Jordan High School; and Gediminas A. Naujikaitis, Brooklyn, N. Y., Bishop Loughlin Memorial High School.

Class 4, Animals and Pets — Jack Vast-Binder, Jr., Lincoln Park, Mich., Lincoln Park High School; Bill Diachin, Pueblo, Colo., Central High School; Stephen D. Beller, Los Angeles, Hamilton High School; and Brian Westveer, Pleasant Ridge, Mich., Lincoln High School, Ferndale.

In addition to the Grand Awards, 16 Second Awards of $200, 16 thirds of $100, and a number of $10 Honorable Mention Awards were given.

Inquiries regarding the fourteenth Kodak High School Photo Contest are being answered by three pieces of literature which provide the young photographer with all the basic information he or she needs to enter the contest. They are sent free of charge.

The same literature "package" is available to high school principals and class advisers for distribution to students interested in competing in the contest.

The three pieces being offered include "Contest Cues," an illustrated leaflet packed with useful photo information; a copy of the catalog illustrating the top award-winning pictures in the 1958 contest; and an illustrated rules folder. The three pieces combine to tell the student-photographer what to take, where to take it, how to take it, and what to do with his pictures once he has taken them.

March 31 is the deadline for entries in the high school photo contest.

For further information regarding the contest, write to *Kodak High School Photo Contest, 343 State St., Rochester 4, N. Y.*

## GRAPHIC ARTS INDUSTRY SCHOLARSHIPS

The executive committee of the Education Council of the Graphic Arts Industry and the Board of Trustees of the Council's National Scholarship Trust Fund, in a joint meeting in New York City, learned from William Egan (The Egan Company, Dallas), chairman of the N.S.T.F. Fund Raising Committee, that over $70,000 had been pledged for scholarships during the past two years. He predicted that much more than this sum would be raised since the Trust Fund recently re-

(Continued on next page)

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## NEWS NOTES

(Continued from previous page)

ceived clearance from the Internal Revenue Service to receive monies from individuals, estates, and foundations on a tax-deductible basis.

Scholarships have been established by the following individuals and companies:

Mrs. Marie Harris Barkley (A. Stull Harris Memorial Scholarship)
Blanchard Press, Inc.
Crown Zellerbach Corporation
Graphic Arts Monthly
Harris-Intertype Corporation
William G. Johnston Company (Robert A. Caffee Memorial Scholarship)
Judd and Detweiler, Inc.
Kable Printing Co. (Heathcote Mann Memorial Scholarship)
Edward I. Miller (Manhattan School of Printing Scholarship)
The Miehle Company
Mrs. R. Verne Mitchell (R. Verne Mitchell Memorial Scholarship)
Rudisill and Company, Inc. (James J. Rudisill Memorial Scholarship)
Southwest School of Printing Foundation Fund
The Sorg Printing Company, Inc.
Vandercook and Sons, Inc.
Elmer G. Voigt (24 teacher summer school scholarships)
Kurt E. Volk
Lucius Wasserman (The Samuel Wasserman Memorial Scholarship)
John M. Wolff
Elmer G. Voigt Craftsmen Educational Trust.

In reporting for the Scholarship Selection and Awards Committee, Chairman Francis N. Ehrenberg stated that applications for eleven scholarships to be awarded beginning with school year 1958–1959 had been received from 151 high school seniors distributed geographically in 28 states and Canada. The applicants must first take the College Entrance Examination Board tests, and the 40 highest ranking will then be interviewed by local groups of printers. Final selection will be made early in May by a committee of educators.

Inquiries concerning the establishment of scholarships should be addressed to *Harold D. Ross, Chairman, National Scholarship Trust Fund, 5728 Connecticut Ave., N.W., Washington 15, D. C.*

## EUROPEAN TRAVEL STUDY PROGRAM IN COMPARATIVE EDUCATION

Wayne State University's College of Education and Graduate School again approve credit arrangements in connection with the Twelfth Annual European Travel Study Program in Comparative Education. Personally directed by Dr. Wm. Reitz, professor of education, the travel-study will leave Detroit on June 18 and return on August 16, 1959.

Visiting 8 countries during the 60-day journey, this program is designed to provide teachers, students, and other professional people with an opportunity to survey selected high lights of the life and culture of Western Europe. There are approximately 350 alumni of the past 11 programs.

Persons may qualify to earn up to 6 hours of undergraduate or graduate credit to apply on degree programs, for teaching certification, for annual salary increments. Others may register for "audit" credit and participate in the program for purposes of personal enrichment.

Further information may be obtained from *Dr. Wm. Reitz, 727 Student Center, Wayne State University, Detroit 2, Mich.*

## SMALL HOMES COUNCIL

Simplification of the University of Illinois wall panel, developed by the Small Homes Council and used in thousands of homes throughout the United States since its introduction four years ago, was announced recently by Rudard A. Jones, Council director. Use of the wall panels makes it possible to completely enclose a house in one day.

Details of the improved design were presented on January 14, when the Council opened its fourteenth annual Short Course in Residential Construction. This course, conducted in co-operation with the Division of University Extension, annually attracts to the Urbana, Ill., campus approximately 400 members of the building industry from as many as 30 states plus provinces of Canada.

Although wall panels had been used by some builders for specific houses, the Small Homes Council panel gained public acceptance when it was introduced in 1954 because it can be used on a mass basis for houses of almost any design having modular dimensions — that is, dimensions which are divisible by 4 inches.

Both the original wall panel and the improved design were developed under research grants given to the University of Illinois by the Lumber Dealers Research Council.

The Council's presentations at the 2-day session held recently included a consideration of high-density housing, garden apartments, the introduction of an intersection roof truss, nail-glued roof trusses, and, among other topics, a discussion of home-buyers' reactions to a group of model homes in Chicago.

Professor Victor A. Hyde of the University's Bureau of Community Planning, was toastmaster for the dinner.


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## PERSONAL NEWS

(Continued from page 12A)

### MR. MOELLER IN NEW POSITION

Carl Albert Moeller joined the staff of the industrial-arts department at North Carolina State College, Raleigh, on September 1, 1958, as an assistant professor.

Mr. Moeller spent the past year at Wayne State University, Detroit, Mich., where he held a graduate fellowship award and has completed all of the course work for the doctor's degree with the exception of his dissertation. He attended the Bay City Junior College; Michigan State University where he received the bachelor of arts degree; Texas A. & M. College where he received the master of education degree. He was an outstanding student having graduated with high honors from Bay City Junior College and Michigan State University, received the Memorial Student Center Appreciation Award from Texas A. & M., and was a member of Epsilon Pi Tau and Phi Delta Kappa honorary fraternities at Wayne State University.

He has had vast experience in industry, and was also a training officer with the Detroit Ordinance District.

Mr. Moeller taught in the North Intermediate Junior High School, Saginaw, Mich., and was an instructor of sheet-metal and design classes at Texas A. & M. College.

### DR. RONALD W. KENT DIES

Dr. Ronald W. Kent, retired director of Essex County Vocational Schools, Newark, N. J., died at his home at Upper Montclair, N. J., on July 19, 1958. He was 68 years old.

Dr. Kent became assistant director of the vocational school system in 1925 and served as director from 1944 until retiring in 1953. He was a member of the Montclair High School evaluation committee and of the Board of Guidance, an advisory group to the town commission.

A graduate of Indiana University, he received his doctorate from Columbia University in 1931. He served as a navy officer in World War I and from 1919 to 1921 supervised training of veterans under the Federal Board for Vocational Education.

Before coming to Essex County Dr. Kent was director of the American Vocational Institute and of the American Business College, both private veterans' training schools in Milwaukee. He was formerly an assistant professor at Ohio State University.

Dr. Kent was former president of the New Jersey State Vocational and Art Association, a member of the Montclair Council of Social Agencies, a director of the Robert Treat Boy Scout Council, and he lectured on vocational education at New York University from 1927 to 1943.

Surviving are his widow, Mrs. K. P. Culver Kent, and two sons.

### MARTIN E. GONSER

Martin E. Gonser, assistant professor of industrial arts, has joined the Industrial Arts staff at Fresno State College, Fresno, Calif. He is teaching in the areas of welding and handcrafts.

Mr. Gonser has had public school teaching experience and formerly taught in the Industrial Education Department of the University of Oklahoma. He received the B.S., and M.S., degrees from Kansas State Teachers College, Pittsburg, Kans., and is currently working toward the Ed.D. degree at Bradley University.

### MR. THIEME RECEIVES APPOINTMENT

Eberhard Thieme has been appointed consultant in industrial arts for the public schools of Rochester, N. Y. He has had teaching experience at Tappan Zee Central School where he taught general schop; at Franklin High School, where he taught drafting; and at West High School where he taught general shop and drafting.

Mr. Thieme completed work for his bachelor's and master's degrees at Oswego State Teachers College, Oswego, N. Y., and he is presently working toward his doctorate at Pennsylvania State College.

In his new position Mr. Thieme replaces George Rentsch who has been given the temporary assignment of directing the equipping of Rochester's New East High School.

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## New Publications

### Liquid and Gases

By Alexander Efron. Soft cover, 117 pp., 5½ by 8½ in., illus., $2.10. John F. Rider Publisher, Inc., New York, N. Y.

The greater the depth to which modern scientific technologists probe, the more they arrive at the fundamental behavior of things. This book is another of the *Basic Science Series* on specialized subjects in the realm of physics. It is a rigorous presentation of two vital areas of physics, at the intermediate level. This book does not attempt to simplify the subjects; rather, its aim is to present the details in an accurate and precise manner, yet making the subjects live and so be completely understandable. In every respect, the

(Continued on page 22A)

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## NEW PUBLICATIONS

(Continued from page 20A)

content is compatible with the modern climate of better science knowledge. Students of high school physics, industrial trainees in physics — in fact, all whose daily duties command a background in the behavior of liquids and gases (inclusive of the ocean and the atmosphere) will find this book very useful.

### Vacuum Tube Characteristics

Edited by A. Schure. Soft cover, 89 pp., 5½ by 8½ in., illus., $1.80. John F. Rider Publisher, Inc., New York, N. Y.

Billions of vacuum tubes are in use and billions more will be put to use in the future. The author has succeeded in presenting an extremely comprehensive discussion on vacuum tube constants and characteristics without wasting any words. Electrons and electron emission are discussed from both the general and the physics viewpoint. Diode characteristics and ratings are explained together with the various formulas involved.

The diode is examined in connection with its characteristic curve, amplification factor, plate resistance, and trans-conductance. Other sections of the book cover the use of the load line in the analysis of triode circuits, characteristics of multigrid tubes and special purpose tubes.

Written at the intermediate level the book succeeds in making the fundamentals of vacuum tube constants completely understandable and very useful. Review questions appear at the end of each chapter.

### A-C Circuit Analysis

Edited by A. Schure. Soft cover, 95 pp., 5½ by 8½ in., illus., $1.80. John F. Rider Publisher, Inc., New York, N. Y.

Alternating current and voltage are the building blocks of not only the communication art but also of the tremendously bread field of electronics. All of the fundamental principles necessary to the understanding of A-C are given in this book in a manner which makes the subject clear. R, L, and C functioning in series, parallel, and series-parallel combinations are lucidly detailed.

An outstanding feature of this book is the treatment of the *j* operator. It is extremely clear and thoroughly presented. Numerical examples show how the different equations contained in the book are solved.

Written at the intermediate level this book is recommended to technicians, laboratory workers, students of technical institutes, and to all who desire more than a casual knowledge of A-C phenomena. Valuable review questions appear at the end of each chapter.

### Arc Welding

By William Sellon and John Matthews. Soft cover, 44 pp., 8½ by 11 in., illus. 50 cents postpaid in U. S. A., 75 cents elsewhere. The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

This is the revised third edition of this basic manual of instruction for learning how to use arc welding, and it includes 92 drawings and pictures. It explains the fundamentals of arc welding and how to use it in simple, nontechnical language, for high school students and other beginning students.

Revisions have been made in the content and sequence of instruction lessons. Material has been added and the entire contents brought up-to-date. The contents include among other chapters: how arc welding is used, arc welding equipment, learning to weld, making welds in all positions, the effect of

(Continued on page 24A


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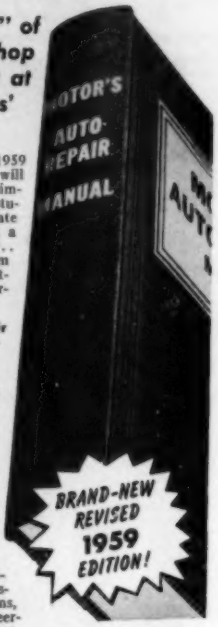


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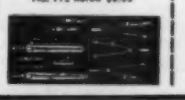

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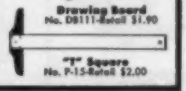

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## NEW PUBLICATIONS

(Continued from page 22A)

heat on metals, cutting with the arc, welding cast iron, welding sheet metal, hard surfacing, and projects.

### Fundamentals of Pipe Drafting

By Charles H. Thompson. Soft cover, 66 pp., 8½ by 11 in., illus., $3.50. John Wiley & Sons, Inc., New York, N. Y.

An excellent text for acquainting the young student with piping symbols, methods of representing these symbols, show him how to make single-line diagram drawings, make schematic drawings, flow diagrams, and make valve designs and control layouts.

The student will also learn about pipes and pipe fittings, specification of parts, and make diagrams and detail drawings.

The appendix also gives the student a knowledge of the language of piping.

### Metallic Rectifiers and Crystal Diodes

By Theodore Conti. Soft cover, 164 pp., 5½ by 8½ in., illus., $2.95. John F. Rider Publisher, Inc., New York, N. Y.

Civilian, military, and all kinds of industrial electronic equipment designs are pointing more and more toward the use of metallic rectifiers and crystal diodes in place of vacuum tubes. This book unfolds the principles and practices of metallic rectifiers and crystal diodes in a very comprehensive manner. While the emphasis is not on the design problems, the details given enable the reader to gain a great insight into the *where*, as well as the *how*, of these devices in a broad variety of applications. Well illustrated and easily readable, the book will add materially to the technical background and capabilities of engineers, laboratory technicians, students of electronics, television and radio repair personnel, radio amateurs, as well as the experimenters who are keeping up with the modern ideas of electronic technology.

### Drawing for Good Reproduction

By Arthur H. Rau. Paper, 33 pp., 8½ by 11 in., illus., $1. National Association of Blueprint and Diazotype Coaters, 1757 K Street, N.W., Washington 6, D. C.

Written by Arthur H. Rau, drafting consultant of General Electric Company, an authority on drafting procedures and techniques, the manual is designed for use in mechanical drawing classes and reproduction departments.

It is printed in two colors with numerous illustrations of drafting techniques and the kinds and uses of drawing materials including drawing and tracing papers and cloths, and pencils and erasers. The manual covers essential elements of good reproducible documents, their preparation and care; prolonging the useful life of reproducible documents; and a brief description of reproduction processes and materials.

### Basic Electronics 2nd Edition

By Paul B. Zoar and Sid Schildkraut. Soft cover, 148 pp., 8½ by 11 in., illus., $2.25. McGraw-Hill Book Co. Inc., New York, N. Y.

This laboratory manual for radio and television technicians is an excellent text to train the increasing number of technicians required to install, maintain, and service electronic products. It is the second edition, and contains 39 jobs all of which are carefully explained and clearly illustrated.

### Automotive Trades — Related Science

By Louis E. Jensen and William A. Brazier. Looseleaf, 177 pp., 8 by 10¼ in., illus., $2.75 less 20 per cent school discount. Delmar Publishers, Inc., Albany, N. Y.

This is a fine example of a work-textbook. It is well written and the illustrations are excellent.

Section I of this text contains 6 units on science, matter, and measurement.

Section II covers 13 units on mechanics and machines.

Section III contains 7 units on magnetism and electrical energy.

Section IV contains 3 units which explain the principles of heat and light.

The book also contains numerous experiments and assignments, and an appendix and an instructor's guide which is free with adoption orders of ten or more.

### Aids to Workshop Practice

By C. T. Bower. Cloth, 192 pp., 5½ by 8½ in., illus., $3.75. The Macmillan Company, New York, N. Y.

A very interesting and helpful book for those who work with tools. Helpful hints are given for assembling work, bolts and nuts, clamping and holding, drilling machine, drills and drilling, electrical work, hacksawing, lathework, shop lighting, lubrication, marking out and measuring, painting, pipes and tubes, power transmission, sanding, filing and polishing, sheet metalwork, soldering, speed checking tapping, and tool protection and storage.

### How to Troubleshoot a TV Receiver (2nd Edition)

By J. Richard Johnson. Soft cover, 150 pp., 5½ by 8½ in., illus., $2.50. John F. Rider Publisher, Inc., New York, N. Y.

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popular and practical guide to locate faults in television receivers. It explains the thinking process, as well as what to do in TV receiver repair. The author has added new categories in the 2nd edition. A new chapter deals with troubleshooting portable TV receivers, vertical chassis, and printed circuits. Another new chapter deals with troubleshooting TV picture tubes; continuing spot of light, "snivits," as well as other irksome problems.

All of the excellent features that were in the first edition have been retained by the author, resulting in substantial expansion in the content. Much of the book was reset with many illustrations enlarged in size. Both beginner and old-timer in TV receiver repair will be able to derive much valuable aid from the 2nd edition.

### Mathematics for Industry

By S. E. Rusinoff. Cloth, 565 pp., 5⅞ by 8½ in., illus., $6.25. American Technical Society, Chicago, Ill.

This excellent text presented herewith is an enlarged second edition of this book. It contains numerous problems actually applied in manufacturing production jobs.

The book contains numerous problems and very many pictures showing graphically the problems that are to be solved. The book contains 15 chapters.

The first of these chapters gives the student a review of arithmetic, and this is continued in Chapter II. Chapters III and IV present the subject of algebra. Geometry and trigonometry are explained in Chapters V, VI, and VII. Chapters VIII and IX contain problems on screw threads and gears. Logarithms are explained in Chapter X, and the use of the slide rule is explained in Chapter XI. Engineering computations, graphs used in engineering problems, computations of automatic controls for automation and problems in inspection and quality control are the subject matter treated in Chapters XIII, XIV, and XV.

### How to Pass High on College Entrance Tests

By David R. Turner and Alison Peters. Paper, 256 pp., 8 by 10½ in., illus., $2. Arco Publishing Co. Inc., New York, N. Y.

This book has long been the standard manual for high school students planning to go to college. Now it is available in the all new 1959 edition. This completely up-to-date book features sample drills in the types of questions that appear on "college boards" and other college entrance tests: reading, English, vocabulary, language aptitude, literature, spatial relations, mechanical insight, figure analogies, and mathematics.

Of special interest to all parents, students, teachers, and guidance counselors is the complete list of U. S. colleges with the entrance test requirements for each.

Intelligent use of this book provides preparation for passing high on entrance tests and entering the college of one's choice.

## BULLETINS AND BROCHURES

### A Vote of Confidence for American Education

By William T. Brady, Corn Products Refining Co., 17 Battery Place, New York 4, N. Y.

### Fat Consumption and Coronary Disease: The Evolutionary Answer to This Problem

By T. L. Cleave, Surgeon Captain — Royal Navy. $2.50. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y.

### Youth Training-Incentives Conference Proceedings

Issued by the President's Committee on Government Contracts, Washington, D. C. U. S. Government Printing Office, Washington, D. C.

### Summer Employment of High School Science Teachers

Study Report by Robert H. Carleton, National Science Teachers Association, 1201 Sixteenth St., N.W., Washington 6, D. C.

### Teachers' Manual and Sourcebook on Automotive Job Sheets

By Harold S. Bostwick and Randolph R. Barr. Published by Chilton Company, Inc., Philadelphia 39, Pa.

### Tentative Specifications for Copper and Copper-Alloy Welding Rods

Issued by the American Welding Society, 33 W. 39th St., New York 18, N. Y., and American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 40 cents each.

### Vocational and Professional Monographs —

No. 12 on Teaching by William H. Burton, 40 pp., $1.

No. 26 on The Iron and Steel Industry by Tom Campbell, 40 pp., $1.

No. 89 on The Coal Industry by M. Edmund Speare, 32 pp., $1.

Published by Bellman Publishing Co., Cambridge 38, Mass.


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## RED CEDAR OR MISKWÁWAK

(Continued from page 58)

nized these excellent lasting and non-warping qualities, the Kiowa and Shoshoni, in particular, making their tipi poles of cedar. The Kiowa name of Yatonba meant *wood for love flute*, since they used this wood for their musical flutes. Because of the excellent finishing qualities and fragrance of the fresh wood, loved too as we see, by our Indian ancestors and modern day brides to be — hope chests of cedar are still popular. And, in spite of facts to the contrary, the myth still survives that this fragrant wood keeps away moths. As a teacher of woods, boys in my classes made dozens of cedar chests back in the pre-World War II era. My wife's own cedar chest, still in use, was made all by hand — no machine work — at Rochelle, Ill., in 1917. Although, as noted, red cedar is fast disappearing commercially, we still find in the Lake of the Ozark region of Missouri many roadside craft shops offering hundreds of novelties of this wood, showing it is still a favorite as in times past.

Looking back to my barefoot-boyhood days on our Indiana farm, I remember as if yesterday, my picket fence hammock which hung between two of the largest red cedars of the group in our back yard. The *cedar apples* were on them, a mystery to me then, and instead of mythical thunderbirds making their home in the cedars' topmost limbs, it was just our guinea fowl's favorite roosting place. Those cedars were anything but sacred to me then, for the sharp, dead fallen needles stuck in my bare feet all too often. Had I known, however, of these Indian myths, those guinea fowl would have become thunderbirds — they certainly made an ear-splitting thundering noise when disturbed from their slumbers — and the cedars something to dream about as did the Plains Indians of old.


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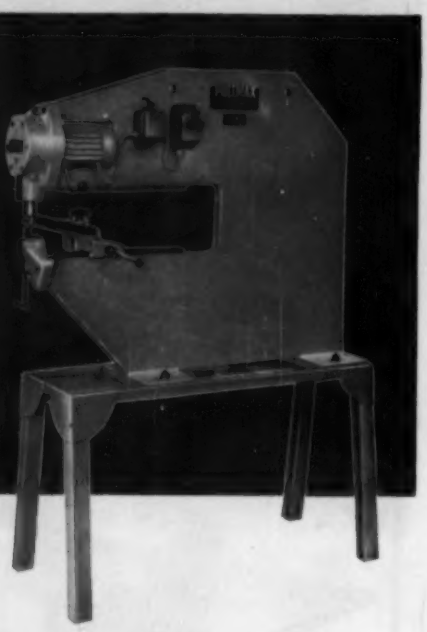

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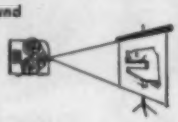

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## Business and Personal News

### JOHN CLAUDE RETIRES FROM ROCKWELL

John Claude, a school shop expert with an outstanding 35-year record of service to the nation's school workshops, has retired from Rockwell Manufacturing Company.

Mr. Claude, who has been with Rockwell as manager, School Sales, Delta Power Tool Division since 1950, spent 26 years as manager

John Claude

of textbook sales and advertising manager of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine for The Bruce Publishing Co., Milwaukee, Wis. He also headed his own industrial arts and vocational education consulting firm.

During his colorful career, which will be continued on a consulting basis for a number of firms, he was: a mechanic for the Old Dusenberg Racing Team, an engineering officer for the U. S. Air Force in France during World War I, and owner and chief mechanic of his own garages specializing in *souping-up* racing cars.

The long-time consultant to architects and

(Continued on page 28A)

LAFAYETTE VOCATIONAL SCHOOL, *Lexington, Kentucky*
Dr. James B. Kincheloe, Superintendent;
Bernard T. Fagan, Director.
Installed by The Frederick Post Co., Chicago, Illinois

## Take a **CLOSER LOOK** at your DRAFTING COURSES

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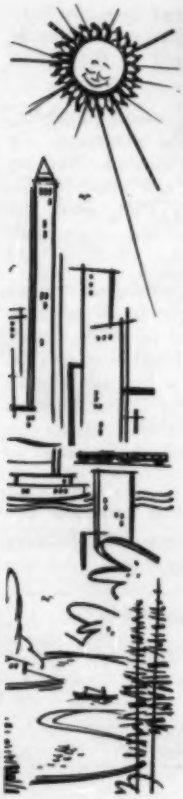

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MSOE was founded in 1903. Previous educational, military, or practical experience is evaluated for advanced credit. Courses are approved for veterans. A placement service is provided for all graduates.

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## BUSINESS & PERSONAL NEWS

(Continued from page 26A)

school officials in the planning of school shops is a Laureate member of Epsilon Pi Tau, national honorary society for industrial arts and vocational education; a member of the American Vocational Association and the American Association of School Administration. He is listed in Who's Who in Commerce and Industry.

As school sales manager for Delta, Mr. Claude has been responsible for many safety improvements in tools and shop layouts. His outstanding record was recognized earlier this year when he was invited by President Eisenhower to attend the President's 10th Anniversary Conference on Occupational Safety.

### MILWAUKEE SCHOOL OF ENGINEERING

Many people feel that the current much-publicized shortage of engineers may partially be caused by the graduation of an insufficient number of engineering technicians from our colleges each year. The current graduation ratio of one engineering technician for every three graduating engineers should be reversed to give us three engineering technicians for every graduate engineer.

The Milwaukee School of Engineering, a pioneer in the concentric curriculum concept of engineering education, graduates both engineering technicians and engineers; and, the MSOE graduation ratio is three engineering technicians for each graduating engineer.

The concentric curriculum system of education gives the student 18 months of technical education, at which point he may elect either to terminate with an Associate in Applied Science degree or to use that academic work as the first 18 months prerequisite for the Bachelor of Science degree.

MSOE offers technical institute type programs in electronics communications, electrical power, computer, air conditioning, industrial and metallurgical technology, and offers baccalaureate degree programs in electrical and mechanical engineering.

Current enrollment at the School totals 2110; 1556 in the Day Division and 554 in the Evening Division. These students are being taught by 91 full- and part-time faculty members.

Students at MSOE study in modern, well-equipped classrooms in eight buildings located near the heart of downtown Milwaukee. Predicted enrollment increases in the near future and more-widespread interest in engineering and the engineering field have led MSOE to embark on a program to provide more of these facilities and a greater teaching staff.

Industrial support is being asked for $1,-150,000 to purchase property in the first phase of a long-range MSOE plan calling for the development of a 25-acre campus located at the present site of the School, using present facilities as a nucleus. The new campus, "Technology Park," is intended to provide a nucleus for private research organizations, technical societies, and other scientific and engineering groups.

### Technician Opportunities Varied

What type of work can the engineering technician expect to pursue when he graduates after 18 months of technical studies?

An electronics communications technician, for example, might become a research and development technician, or a production supervisor, or a radar and high frequency technician, or a television technician; and a metallurgical technician might enter the re-

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search of testing fields, or become a heat treatment or foundry technician, or a production planner.

Similar job opportunities can also be listed in the other technician fields being taught at MSOE.

A number of student services are made available by the School to help the student in his quest for a technological education. Among them are a part-time employment service (a recent survey revealed that as many as 80 per cent of the MSOE students work part-time during some portion of their stay at MSOE); aids to students in finding permanent employment after graduation (interviewing facilities are made available to company employment representatives who wish to talk with graduates); and a School and Industrial sponsored scholarship program.

Under the scholarship programs, qualified high school graduates and MSOE students can be given grants providing full or partial tuition payment, and, as with many of the industrial sponsored scholarships, may be offered part-time work with the sponsoring company while attending school and the opportunity for permanent employment with that company after graduation.

MSOE students have an opportunity to advance both professionally and socially while attending school through membership in technical societies such as the American Institute of Electrical Engineers, the Student Electronic Engineers Society and the professional-social fraternities at MSOE.

Milwaukee School of Engineering alumni, both engineering and engineering technician graduates, hold responsible positions in American industry, and have made significant contributions to today's technological society. Future graduates are faced with an even greater challenge as technology assumes an increasingly more important part in our way of life.

## KESTER SOLDER COMPANY

Kester Solder Company will complete its 60th year in business in January, 1959. Started in 1899, the Kester firm was the first manufacturer of flux-core solder for the infant electrical industry. This long-time Chicago manufacturer is now prominent in the electronic, automotive, and hardware fields.

In addition to its Chicago plant, Kester manufactures its numerous trademarked products for industrial and re-sale markets at Newark, N. J., and Brantford, Canada. The Chicago plant is also the site of the firm's research laboratory where new solder products for industry are developed.

Frank C. Engelhart is president, and the company has remained under the same management since its inception. The firm is releasing a colorful four-page folder to observe its anniversary.

## MR. RUSSELO APPOINTED SALES ENGINEER

B. G. Russelo has been appointed sales engineer for the Machine Tool Division of Kalamazoo Tank & Silo Company in Michigan, Ohio, Pennsylvania, and West Virginia. This announcement was made by J. J. Davitt, divisional sales manager from the company's home office in Kalamazoo, Mich.

Mr. Russelo has been selling Kalamazoo Metal Cutting Band Saws for the past 15 years as a Midwestern distributor salesman. He will now operate out of Detroit providing better service and affording closer co-ordination between distributor and Kalamazoo Tank & Silo Company.

Kalamazoo's Machine Tool Division manufactures a full line of horizontal metal cutting band saws, cutoff machines, and accessories for the metalworking industry.

Brown & Sharpe tools in the hands of a young machinist bring out his best work. They are long-lasting, easy-to-use tools of professional quality that will help him now and in the years ahead.

NEW B&S CONVERTIBLE THIMBLE MICROMETER
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Converts to either "friction" or "fixed" type

Offers finger-tip, one-hand control

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Placement of the friction sleeve and a new lever-type lock make this an easy mike to use in one hand.

Other advantages: Floating lock does not affect spindle alignment; easy zero setting adjustment included; oblique barrel graduations and numbered, wide-spaced thimble divisions aid positive reading at all angles; carbide measuring faces assure long wear. Measures 0" to 1" in .0001".

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# Descriptive Material

## BROWN & SHARPE BULLETINS

Complete description and specifications covering the new Brown & Sharpe No. 510 Surface Grinding Machine are available in the company's Bulletin GM 54. This well-illustrated booklet details design features and accessories available for Brown & Sharpe's new low-cost precision surface grinder. The machine has special appeal to tool and diemakers.

Their specification bulletin covering their all-new 618 Micromaster Surface Grinding Machine shows the three basic models of the Micromaster with hydraulic and hand longitudinal and hydraulic and hand cross-feeds; hydraulic and hand longitudinal and hand cross-feeds; and hand longitudinal and hand-cross feeds.

This booklet is called 618 Micromaster Bulletin. Both booklets available upon request.

**(For further details encircle index code 0211)**

## BULLETIN DESCRIBES DELTA LAMP ATTACHMENT

A new one-page, photo-illustrated bulletin describing the Delta Lamp Attachment is available from Rockwell Manufacturing Company.

The heavy-duty lamp is ideal for intricate jobs requiring a strong, close-up light, and can be used on radial saws, drill presses, shapers, lathes, and other industrial tools.

Five photographs illustrate how the attachment can be used with various tools. The bulletin also includes specifications.

For a copy of this bulletin (AD 1155) write Rockwell Manufacturing Company, Delta Power Tool Division.

**(For further details encircle index code 0212)**

## CHALLENGE DESCRIPTIVE CATALOG

The Challenge Machinery Company have issued a handy new descriptive catalog, with prices, covering over 300 standard items of Challenge Precision Surface Equipment. Included are both semi-steel and granite surface plates; also semi-steel angle plates, V blocks, box parallels, straightedges, bench plates, welding tables, heavy duty work benches, layout plates, lapping plates, and similar equipment.

When writing, ask for Catalog No. 839.

**(For further details encircle index code 0213)**

## NEW PLASTICS PROJECTS FOLDER

O'Neil-Irwin Mfg. Company, makers of Di-Acro Precision Machines for school and industry, have just published a new folder which contains complete project plans and instructions on fourteen projects which can be made from sheet plastics by thermoforming.

The projects included in the file are industrial education projects which have been designed and constructed by industrial education teachers and students. The thermoforming operations necessary to make the projects are basically the same as those used in industry: mechanical stretch forming, vacuum forming and blow forming. The projects represent many applications of each of the basic types of forming.

These projects are designed to provide experience at all progress levels. The same article may serve both as a beginning and advanced project. With lower level students the instructor may supply the forms and molds; in advanced classes the student may design or construct the forms and molds as well as the finished article. Students get a range of experiences from simple machine operation to advanced designing and mold making.

There is a charge of 25 cents on each project folder.

**(For further details encircle index code 0214)**

## PEXTO BULLETINS AND BOOKLET

The Peck, Stow & Wilcox Company have issued new bulletins describing their machines and tools for use in school shops and in industry.

Bulletin No. S-36 lists and describes their machines and tools for sheet metalworking for school shops.

Bulletin No. 157 presents foot squaring shears.

Booklet No. 139A contains 48 pages of detailed descriptions of numerous sheet-metalworking tools, including bar folders, beading machines, bench plates, bench shears, box and pan brakes, brace and wire benders, brakes for hand bending, hand and power burring machines, circle shears, circumference rules, combination rotary machines, crimping and beading machines, double seamers, eave trough end closing forms, elbow edging machines, flanging and folding machines, hand and power forming rolls, funnel former, furnace collar edging machine, grooving machines, gutter beaders, gutter tongs, miscellaneous hand tools, notching machines, power rotary machines, hand lever punches, hand and power ring and circle

**CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION**

(Continued on page 37A)

4 new "package deals" on machinery for your shop!
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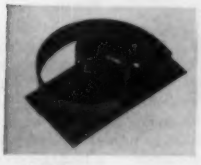

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*(For more information from advertisers, use the postcard on page 39A)*

# Shop Equipment News

## PERMA-SCALE INTERMEDIATE FILM

Eugene Dietzgen Company announces the development of a new Diazo Sensitized Film for producing duplicate originals. Known as Perma-Scale Intermediate Film, the Mylar base of this new material provides great ease of eradication, extraordinary toughness, and dimensional stability.

Perma-Scale Intermediate Film is sensitized on its glossy reverse side. Thus, repeated eradication on this glossy surface cannot affect the front matté surface for making engineering changes. Lines from the original drawing are easily eradicated with a cotton dauber dipped into a mild, solvent-type chemical, or with an ordinary typewriter eraser and erasing shield. The company reports that in many cases better prints can be obtained from the duplicate original than from the original drawing.

Perma-Scale Intermediate Film is made on a DuPont Mylar base which provides great toughness, stability, and permanence. With its tensile strength of 20,000 p.s.i., tensile modulus of 550,000 p.s.i., and flex-life of 20,000 cycles, Perma-Scale Intermediate Film retains its original flexibility and transparency almost indefinitely, and is virtually impervious to water and perspiration.

It is available in both sepia and black line, products with superior actinic opacity that provide outstanding reprint qualities and excellent visual contrast.

Further information and samples available upon request.

**(For further details encircle index code 0201)**

Diazo Sensitized Film


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## SALESMATE FOR INDIVIDUAL TRAINING

Charles Beseler Company have announced their completely portable and automatic sound slidefilm viewer in an attaché case. It is called the Salesmate.

The new viewer permits employees to receive training one at a time or in small groups at convenient times and locations, rather than in larger, less convenient groups. The new unit weighs only 19 lb., and measures 17½ by 13½ by 6 in. The entire package, consisting of slidefilm projector, amplifier, tape playback, and fold-out screen, is contained in a honey-colored calf-vinyl attaché case. The film is always ready to show because both film and tape are on continuous-loop cartridges and the transistor amplifier starts instantly — without warm-up.

Salesmate, the new portable sound slidefilm viewer

*(For more information from advertisers, use the postcard on page 39A)*

To operate the Salesmate, it is necessary only to open the screen, plug in the cord, push the red button, and the show is on. The film advances automatically by means of an inaudible signal on the tape. When the show is over, Salesmate shuts itself off.

The Salesmate show consists of up to 150 still pictures accompanied by up to 12½ minutes of sound. Any type of photograph, cartoon, or illustration can be shown in black and white or full color on the Salesmate screen. Any kind of voice or sound effect can be put on the high fidelity tape. The pictures are automatically synchronized with the sound. The special built-in "million lens" rear projection screen resembles a 17-in. TV-type screen.

Arrangements may be made for any company to have its own Salesmate training or sales program.

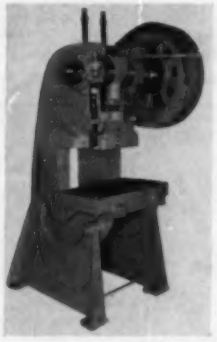
**(For further details encircle index code 0202)**

## NEW 40-TON PRESS-RITE PRESS

Sales Service Mfg. Company have introduced the new 40-Ton Press-Rite O.B.I. Press to use for large or bulky die sets for die cast trimming, electronic work, etc., that usually requires a larger press.

The steel fabricated frame, heavily reinforced at all vital points, makes it possible to provide a very generous ram area, large bed area, and extra depth of throat. This is to permit handling work normally placed on higher tonnage machines to obtain the necessary die space.

The press is available in flywheel or back-



New 40-Ton Press-Rite Press

geared type with either Press-Rite mechanical or Airflex Air Friction Clutch, greater than standard shut height, longer or shorter than standard 3-in. stroke and other optional features.

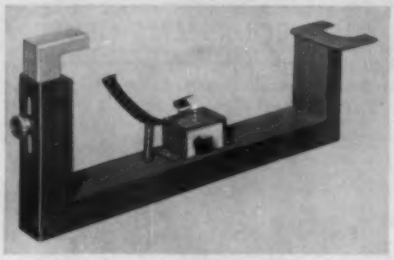
Complete information available.

**(For further details encircle index code 0203)**

## NEW TORSION-AIRE HEIGHT GAUGE

Snap-on Tools Corporation have introduced their new Torsion-Aire Height Gauge, designed especially for use on all Chrysler products equipped with torsion-aire suspension.

It consists of a metal frame 16 in. long, with an "arm" at each end and with a highly accurate, easy to read liquid level mounted on the frame between the arms. One arm is stationary and has a "C" shaped shoe on top, designed to bear firmly against the lower edge of the ball joint nut. The opposite arm has a movable sleeve, adjustable to manufacturer's recommended height settings. This sleeve is calibrated in 1/16-in. increments from 1½ in.,



New Torsion-Aire Height Gauge

to 3 in. A thumbscrew on the side of the arm is used to secure the sleeve at the desired setting.

The liquid level is equipped with a 2-sided scale, and is of the "see through" type. This scale is calibrated in increments of 2 deg., and measures up to 40 deg., on either side of zero. A gauge retaining spring mounted next to the level holds the gauge to the flange of the lower control arm during tests.

Further description of additional fine features is available on request.

**(For further details encircle index code 0204)**

## NEW INDUSTRIAL SAFETY GUARD

AMF DeWalt, originator of the radial-arm principle in homeshop and industrial power tools, has introduced a new industrial safety

(Continued on next page)

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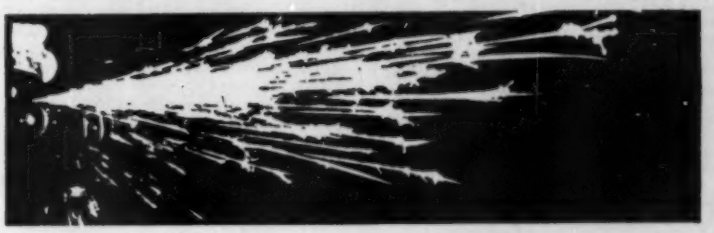

The Chinese say "a picture is worth 10,000 words." That's especially true in a shop, where many things can't be explained (in a book) any other way. Like the emery wheel test to identify different kinds of iron and steel. Shown above is a typical illustration (one out of 1241) from McKnight's book, METALWORK, Technology and Practice. By comparing photographs of sparks given off during the test, a student can quickly learn to recognize the kind of metal he's working with. And by comparing McKnight's shop books with others, you'll quickly see why they are the most popular in America: *They make good teaching easier.* Write for catalog. Use handy coupon below.

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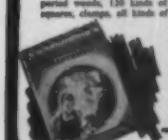

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## SHOP EQUIPMENT NEWS

(Continued from previous page)

New Industrial Safety Guard

guard designed to fit all standard DeWalt industrial woodworking machines.

It was developed for use in a variety of shaping, jointing, and rafter notching applications, which are formed on the radial-arm machine by simply placing the motor, which holds the cutting tool, in vertical, or beveling positions. Made of aluminum, the new guard is fully adjustable to any angle, and to the desired clearance of any lumber thickness.

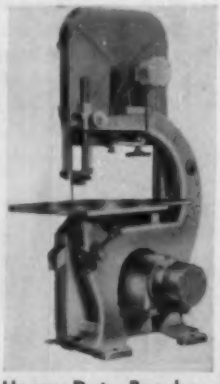
The design of DeWalt machines permits the cutting tool to be suspended above the surface of the material being processed. This feature allows the guard to safely enclose the cutting tool from side approaches and across the top. It is almost impossible for the operator's hands to come into contact with potentially dangerous areas during normal operation.

**(For further details encircle index code 0205)**

### IMPROVED NORTHFIELD BANDSAWS

Northfield Foundry & Machine Company have announced improvements in their 36-in. heavy-duty bandsaw. These include a stronger frame, a tension indicator, and a new blade tracking guide. Over-all quality has been further improved with new manufacturing methods.

The 36-in. bandsaws are available in direct motor drive 3 to 7½ h.p., and with belt drive. Belt driven bandsaws are adaptable to cutting metals, plastics, fabrics, woods, and other materials. Speeds can be varied by changing drives or by the use of a variable speed unit. Every Northfield bandsaw is elec-



Heavy-Duty Bandsaw

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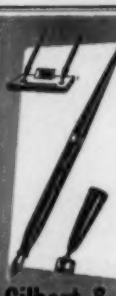

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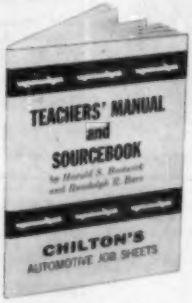


Following standards recommended by the IA-VE Conference, these BRAND NEW teachers' aids were created for use in the school shop. Never before available. They conserve teaching time by reducing the need for lecture-type instruction. Separating the "how to" from the "why," these flexible job sheets can be used on live cars or instructional units and varied according to the equipment used.

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Northfield 36-in. bandsaws are also available with greater capacities under guide and for left-hand operation. A choice in brakes is offered of lower wheel foot brake (standard); two wheel foot brake; or a two wheel fully automatic braking system. Northfield bandsaws can be modified for special applications.

**(For further details encircle index code 0206)**

## CRAFTOOL VISUAL AID CHARTS

Craftools, Inc., announces a new series of instructional wall charts and work sheets. These charts, 16 by 20 in., present a graphic, illustrated step-by-step visual aid for the creative crafts and arts.

The first series include the following 8 charts, each 16 by 20 in., and 8 work sheets, each 8½ by 11 in.

1. Basic process of the Lithograph
2. Basic process of Etching
3. Basic process of Wood Cuts and Wood Engraving
4. Basic process of Linoleum Cutting
5. Basic process of Throwing on the Potter's Wheel
6. Basic process of Bookbinding
7. Basic process of Sculpture
8. Cleaning the Shop

A set of Charts and Work Sheets will be distributed free of charge to schools and institutions requesting them on their letterheads. Further information available on prices, etc., to those requesting it.

**(For further details encircle index code 0207)**

## NEW CIRCULAR SAW BLADE SHARPENER

Martin Saw Filer have introduced a unique circular saw blade filer, which eliminates costly sharpening charges and waiting time, for use in schools, home workshops, or small woodworking industries.

Martin Saw Filer

The new woodworking product — The Martin Saw Filer, has been designed to quickly and accurately sharpen any circular saw blade while it is on the saw arbor.

The complete Martin Saw Filer kit consists of a steel file, wood base, and metal slide. The special steel file gives smooth, accurate edges to saw blades; the wood base is designed for ease of movement and will not mar the saw table; and the metal slide, which attaches to the miter gauge, provides an even and steady base.

The Martin Saw Filer can be easily and quickly set up, and is simple to operate.

**(For further details encircle index code 0208)**

(Continued on next page)

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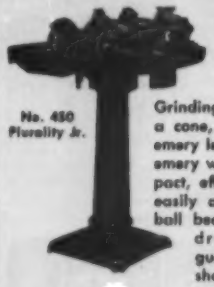

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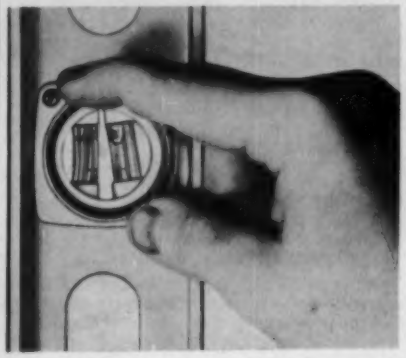
## SHOP EQUIPMENT NEWS

(Continued from previous page)

### NEW LINE OF MAGNESIUM LEVELS

The Columbian Vise & Mfg. Company announce a new line of magnesium levels featuring "finger-tip" adjustable, replaceable vials. These vials are of 2-piece construction. By slightly loosening two mounting screws, vials can be easily turned until proper adjustment is attained. This is to assure continuous, maximum level accuracy.



New Magnesium Levels

The new levels are made of extruded magnesium I beams. One third lighter than aluminum, they are virtually unbreakable. Levels are available in 7 lengths: 24-28-30-48-in. levels have 6 vials, 4 plumbs, 2 levels; 72-78-96-in. levels are of the 10-vial type, 6 plumbs, 4 levels. Weights vary from 1¾ lb., each for 24-in. levels to 6½ lb., for the 96-in. size.

Full details available. Ask for Bulletin LL-8921.

**(For further details encircle index code 0209)**

### NEW ROLLCHARTS FOR TUBE TESTERS

Electronic Instrument Company announces the availability of new rollcharts for the Model 625 (625-06) and the Model 666 (666-03) tube testers. These new rollcharts incorporate the listings for the newest tubes. This is in line with EICO's policy of constantly keeping all of its products as up-to-date as possible.

**(For further details encircle index code 0210)**

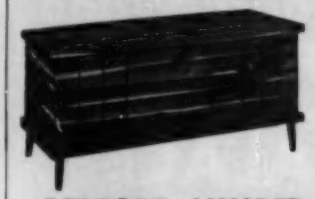
**CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION**

You can have a built-in measuring rod on your worktable. Before re-surfacing the table, mark off inches on the wood. Then apply two pure, thin coats of fresh, white shellac. Allow the first to dry before putting on the next.

— *Shellac Information Bureau.*

It costs three to four times as much to increase the octane number of gasoline by one point at the 96 octane level as it does at the 84 octane level. — *Petroleum Newsnotes.*

KNOCKDOWN CEDAR CHESTS and AROMATIC RED CEDAR LUMBER



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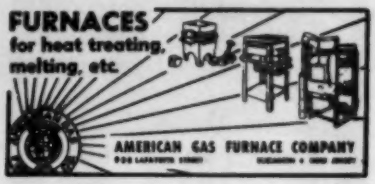

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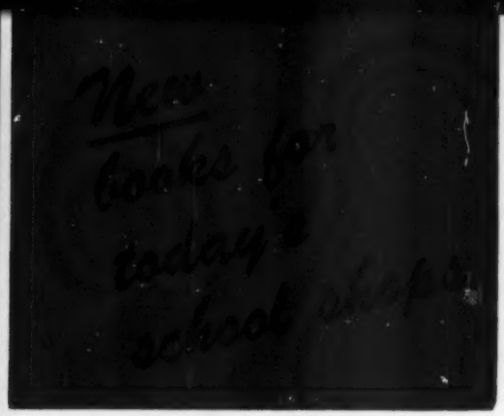


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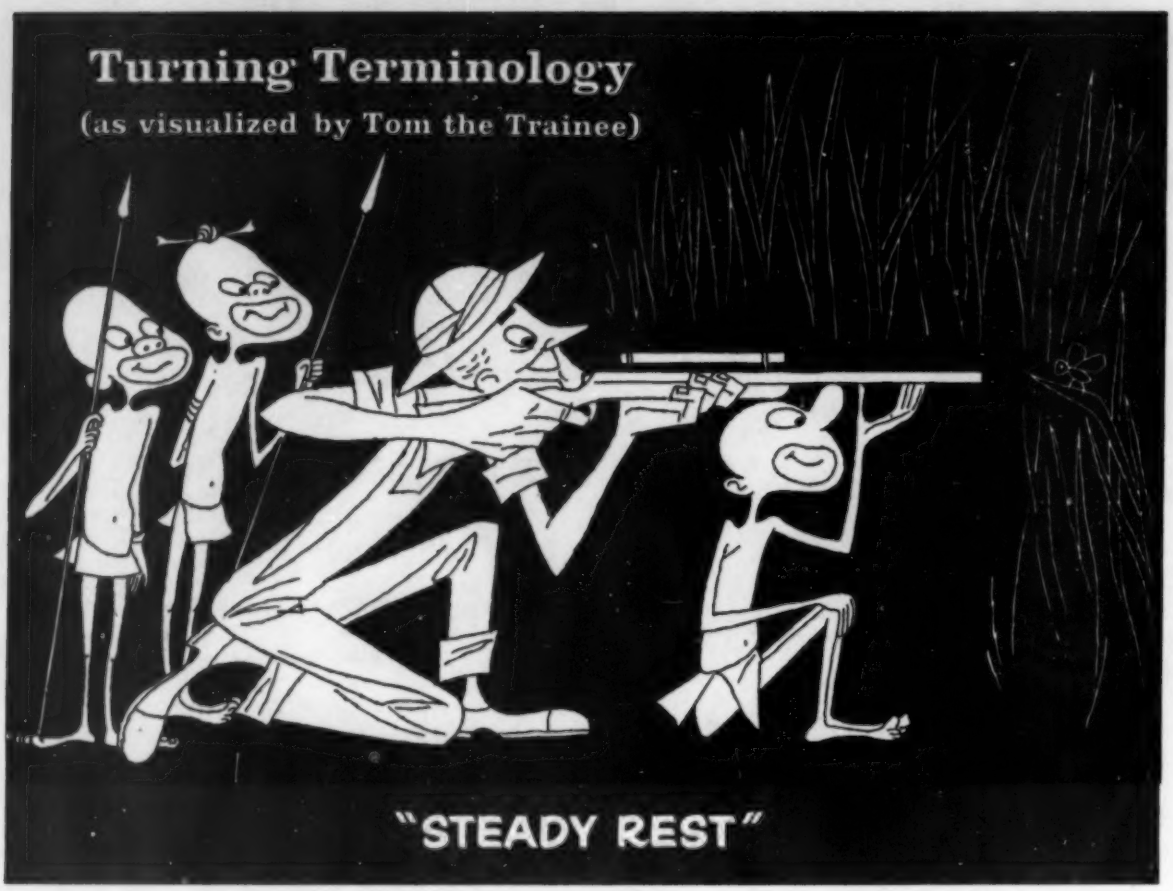


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